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HUMAN CONSTITUTION

ITS SIGNIFICANCE IN MEDICINE AND HOW
IT MAY BE STUDIED

THE INFLUENCE OF SEX IN
DETERMINING HUMAN DISEASE
POTENTIALITY

THE PATIENT AND HIS
PHYSICIAN

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GEORGE DRAPER

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IT MAY BE STUDIED**

II. THE INFLUENCE OF SEX IN DETERMINING HUMAN DISEASE POTENTIALITY

III. THE PATIENT AND HIS PHYSICIAN

THE BEAUMONT FOUNDATION LECTURES

SERIES NUMBER SEVEN

I. HUMAN CONSTITUTION

ITS SIGNIFICANCE IN MEDICINE AND HOW
IT MAY BE STUDIED

II. THE INFLUENCE OF SEX IN DETERMINING HUMAN DISEASE POTENTIALITY

III. THE PATIENT AND HIS PHYSICIAN

BY
GEORGE DRAPER, M.D.
Columbia University



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INTRODUCTION

There is always a place, a welcome, and a good chance of being read through from beginning to end for the small book of good title, of fundamental truths, attractive style and withal an example of bookmaking; such is here before the reader.

In the table of contents is the outline of three parts. Part I, upon human constitution, is an example of clear thinking upon a subject which is daily neglected and much to the detriment of good diagnostic practice as well as detracting from general therapeutic efficiency. The author rightly observes that the study of human constitution is not an easy task. But it is a fascinating and profitable one.

The following subheads partition the subject admirably—Definition, The Clinical Program, Genetics and Clinical Medicine, Endocrine Influence, Value of Careful Histories, Changes of Constitution, Classification of Human Beings by Disease Groups, Immunity, The Psychic Panel.

The taster of books can easily and profitably read any one of the divisions, then return at leisure and re-read or satisfy an awakened interest by a careful complete reading and meditation upon the illustrations. The practitioner could do well by making frequent reference to the two last sections, "to catch and record the elusive quality of Man's personality or psychic pattern."

The sex mechanism, its immortal enterprise, its disease rearranging propensities are discussed and effectively illustrated in Part II. A suggestive sex ratio tendency to certain diseases involving the protective and energy accumulating mechanisms is shown in parallel tables on pages 47 and 48.

The author finds that all forms of congenital malformations are more common in males and this leads to the question—is this because the female is less highly differentiated and the male more complex by being farther from the species types?

In Part III one finds direction for the use of faculties of mind and heart in the intimate relations of patient and his physician. Human beings are regarded as mindbodies, not two compartment parts. The great majority of people's ills are not organic but are found to be disbalances between psychological and physiological panels.

The author, Dr. George Draper, is very clearly discerned in text and illustrations throughout this chapter as a tactful clinician who has thought through from didactic fundamentals the principles of application for patient and physician as should be used in office and clinic.

This book commends itself as a work of greatest value to both physicians and patient and the Lectureship Foundation Committee bespeak for it a wide circulation.

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CONTENTS

PART I

HUMAN CONSTITUTION: ITS SIGNIFICANCE IN MEDICINE AND HOW IT MAY BE STUDIED.....	1
--	---

PART II

THE INFLUENCE OF SEX IN DETERMINING HUMAN DISEASE POTENTIALITY.....	26
--	----

PART III

THE PATIENT AND HIS PHYSICIAN.....	56
------------------------------------	----

ILLUSTRATIONS

FIRST LECTURE

Fig. 1. The diagram of the phenotype.....	2
Fig. 2. Case of excessive mesodermal development.....	3
Fig. 3. Genetic chart of family of patient shown in figure 2.	4
Fig. 4. Wheeler's insects.....	12
Fig. 5. Wheeler's insects.....	14
Fig. 6. Gall bladder and gastric ulcer jaw.....	15
Fig. 7. Pende's sympathetic endocrine diagram.....	18
Fig. 8. Psychological panel diagram.....	21

SECOND LECTURE

Fig. 1. Diagram of cell lineage in <i>Ascaris</i>	27
Fig. 2. Brown Leghorn.....	28
Fig. 3. Seabright Bantam.....	29
Fig. 4. Gynandromorphic mosaic. Diagram.....	32
Fig. 5. Schematic cross-sections of total personalities.....	32
Fig. 6. Case I.....	33
Fig. 7. Case II.....	33
Fig. 8. Case III.....	39
Fig. 9. Case IV.....	39
Fig. 10. Close-up of case IV.....	41
Fig. 11. Gall bladder, male.....	41
Fig. 12. Graves disease, male.....	51

THIRD LECTURE

Fig. 1. Meningitis susceptibility.....	59
Fig. 2. Panels of personality and environmental pressure...	60
Fig. 3. The Circus of Life.....	62

PART I

HUMAN CONSTITUTION: ITS SIGNIFICANCE IN MEDICINE AND HOW IT MAY BE STUDIED

The term Human Constitution, to serve our medical purpose, must properly connote that aggregate of hereditary characters, influenced more or less by environment, which determines the individual's reaction, successful or unsuccessful, to the stress of environment. Thus, in this sense, there are two aspects to constitution, one which is inherited and inheritable (idiotypic), and another which is influenced and noninheritable (paratypic). Tandler (1) and Julius Bauer (2) speak of the later as "condition." Quite clearly then, the individual who presents himself for study is the up-to-the moment expression of the combined forces of heredity and environment. Such a specimen is technically called a phenotype ($\phi\alpha\iota\gamma\omega$ = to appear), and obviously may vary to considerable degree from his natural inheritance (idiotypic or genotypic) pattern. The term paratypic is given to those environmental influences, which, acting upon the genotype help to produce the actually realized individual or phenotype (fig. 1). It must be remarked at this point that among geneticists there is a proper objection to the dependability of morphology as an index of the presence of other inward or unseen qualities in the organism. Siemans (3) and others have pointed out that experiments with both plants and animals have repeatedly shown that in dominant inheritance a heterozygous individual may not be externally distinguishable from the homozygous; and that it is not possible to judge of other inherited factors from the externals of a heterozygous form. As Siemans puts it, "Individuals that are similar in appearance (as

phenotypes) may be very different from one another in their inheritance patterns (idiotypes). But, reversely, individuals that are identical in their inheritance patterns (idiotypes) may look very different as realized organisms (phenotypes)."

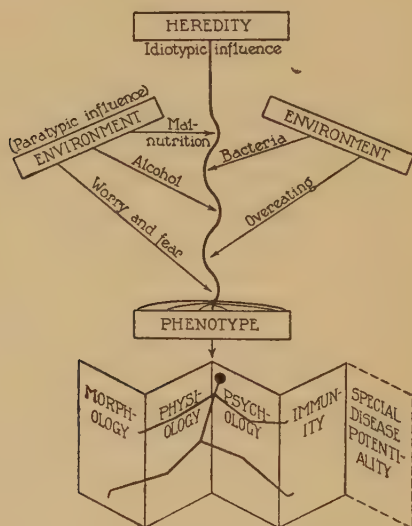


FIG. 1. Diagrammatic representation of the elements producing the phenotype or realized individual.

THE CLINICAL PROBLEM

The problem is somewhat modified in clinical medicine. For it must not be forgotten that the predisposition to a given disease may well be a dominant character which cannot display itself until the appropriate disease, arising from the clash with the specific external agent, demonstrates its latent presence. Thus such a dominant susceptibility may lie unrecognized in a fortunate person who escapes the clash, just as an unexpressed recessive character does in the skipped phenotype.



FIG. 2 Case of excessive mesodermal development showing subcutaneous fibromata, redundant visceral conjunctiva, bilateral ptosis and diabetes.

GENETICS AND CLINICAL MEDICINE

The importance of genetic studies for the medical clinic has recently been emphatically discussed by Barker (4), who points out, among other things, that notwithstanding the difficulties of obtaining dependable data, nevertheless much information to illuminate genotypic patterns can be secured. For example, in figure 2 is shown the diagram of the family tree of an individual who presented an unusual group of tissue defects, to wit; a combination of double ptosis of the eye lids, subcutaneous fibromata, poor vision and redundant visceral conjunctiva. The persistence of these characters in such a large number of the family members illustrates the possibility of similar inheritances of faculty characters, which, while not so obvious externally, may well occur in the vital capacities of other tissues. As a matter of fact, this patient originally came to the hospital because of a mild diabetes. After the genetic studies had demonstrated the strong idiotypic tendency to excessive development of mesodermal tissue, the possibility suggested itself that the function of the islands of Langerhans in this patient had been interfered with by over production of the supporting mesoderm of the pancreatic structure.

Turning now to the effects of environment, a striking example of a modifying parakinetic influence upon the anatomic panel is to be found in the effect of castration upon long bone growth. Tandler and Gross (2a) state that in the religious sect of the Skopsi, where youthful mutilations are practised, the castrates are larger than the average of their race. Several years ago I reported the case of an individual who had grown six inches in height within a few months following a destructive orchitis due to mumps. In the physiologic panel one has only to mention malnutrition in early youth to call to mind the great variety of inadequate constitutional states which

depend largely on the adverse parakinetic influence of insufficient or improper food. But the parakinetic influences which have seemed to us recently to be of especial interest, and which may be subversive of the idiosyncratic plan, are those which act upon the psychic panel. The difficulty, however, of dealing with this aspect of the study of constitution is very great, because as yet there are no true tests of psychic reactions. Furthermore, there is reason to believe that the endocrine glands, which exert such important effects upon growth, development and vital function generally, are directly influenced by

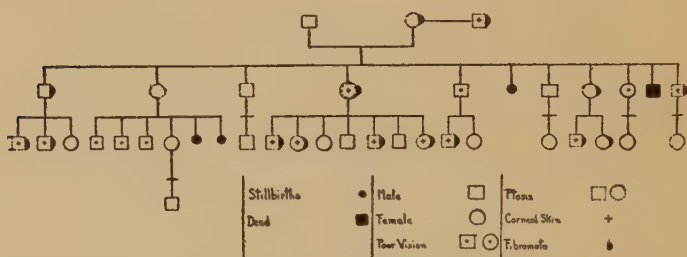


FIG. 3. Genetic chart of family of patient shown in figure 2. Inheritance of redundant conjunctiva, ptosis, and cutaneous fibromata.

emotional stimuli. To the support of this belief many illustrations from common folk-lore and medical experience can be brought. In almost all primitive tribes the phenomenon of menstruation is surrounded by the fear emotion to such a degree that the woman is practically ostracized during her period and not permitted to touch any object or food vessel used by others. It is not hard to imagine what the reciprocal effect upon the individual woman this attitude of the tribe must be. The implication that she is poisonous inevitably must arouse emotions in which resentment and fear play a strong part. The menstruation taboo has probably now found its explana-

tion in the recent studies by Macht (5) from Abel's laboratory which demonstrate that substances capable of withering flowers emanate from the hands of menstruating women. Furthermore, the effect of menstruation upon the bowel function is well known to physicians. A very large percentage of women experience increased peristalsis just before the period is due. Still further in this connection may be mentioned the similar bowel stimulating influence of the erotic emotion. The complete cessation of menstruation for months, or even years, under the pressure of some emotional experience is, likewise, a well known occurrence. Yet in the present state of our knowledge we can bring to the elucidation of these psychophysiological phenomena little better than empirical beliefs. However, these empirical beliefs are built upon clinical observations and correlations which are so convincing as to warrant further thought and investigation.

ENDOCRINE INFLUENCE

There is no longer any question that the gonads, pituitary and thyroid glands are definitely involved in the phenomena of growth and development. The relationship of the adrenal glands to the self-preservative mechanism is also well known. Furthermore, it is now generally recognized that any of the emotions concerned with self-preservation or perpetuation can produce profound physiologic effects through their influence upon the glands. Indeed, under a terrific fear emotion, the transient picture of Graves' disease may arise. What then may be the effect of fear established in childhood and acting continuously through subsequent years, below the level of conscious consciousness, upon the thyroid's participation in the growth process? Obviously, the effect will differ in each individual, depending on the other factor, his inherited or idiosyncratic constitution. Thus similar fears will

affect one person differently from another, just as similar chemicals or bacteria will affect different individuals differently. Still further evidence of the interrelationship of emotions and bodily function is to be found in the observation that patients suffering from chronic fear find their way either to the endocrinologist or the psychiatrist, for they are generally diagnosed as an endocrine imbalance or a neurosis.

VALUE OF CAREFUL HISTORIES

In order to emphasize the great clinical importance of histories and examinations which display both idiosyncratic and paratypic values, it may be of interest to present two cases which illustrate the effects of similar parakinetic forces acting upon phenotypes whose idiosyncratic patterns differed widely. Each one of these patients was shocked in early adolescence by the father's suicide.

The first one, a woman, aged thirty-four years, presented herself with tremor, rapid pulse, mild exophthalmos and a swollen thyroid. At the age of eight years she had stumbled over her father's body in the dark, and her hands, thrust out to break her fall, plunged into the pool of blood from his cut throat; and the light turned on at that moment disclosed the gaping wound in his neck. This ghastly memory never left her and completely outweighed and obliterated her very terrible war experiences in France, which ended in the blowing to pieces of her fiancé at Ypres. But this patient's mother had a small tumor of the thyroid and her siblings were thin and tall. Possibly further evidence of her bad glandular heritage, if not the effect of the shock, was the history of menstrual onset delayed until the seventeenth year.

The second instance was that of a man, aged forty-eight years, who had complained of chronic indigestion and finally developed an ulcer of the stomach. In early

youth this patient had lived in great luxury, but when the father shot himself there followed a humiliating disclosure of mismanagement and misuse of funds. The result necessitated complete change in the youth's mode of life. And then followed years of misery for an exceedingly proud spirit. He dropped his friends, lest they should drop him, and became a recluse. Unlike the first case, this patient's family showed no glandular dyscrasias. His pulse rate was 66 and he was well nourished, but he was always easily fatigued.

If these emotional experiences are sufficiently potent to be accepted as playing some part in the causation of the disease of these two patients, it is logical to ascribe to them also parakinetic values in the production of modified constitutions. Consequently, a complete study of any given human phenotype should include not only observations of his special qualities, as expressed in the four panels of personality (morphological, physiological, psychological, immunological) but likewise as has been said, as thorough a genetic and environmental history as possible. For it is essential that the physician know both his idiotypic pattern and his paratypic modifications.

CHANGES OF CONSTITUTION

If we accept the interpretation of constitution already stated, that it represents the result of idiotypic and paratypic forces, we must also recognize that it is continuously unique for any given individual from the moment of conception until death.

Thus it is quite clear that the constitution changes with the different phases of growth and development which occur in the life of the human organism. Any comprehensive study of the question of human constitution, therefore, may well be divided into five main epochs; the first, that which precedes puberty; the second, those

years which include the puberty process; the third, that longer stretch of the active, vigorous, adult life; the fourth, the episode of climacteric; the fifth, the period of decline subsequent to this. The organism obviously possesses a different arrangement of potentialities in each of these periods with which to meet the pressure of environment. This continual change in the phenotype, of course, depends on the continual accumulation of the effects of paratypic influences. From this point of view all the studies that have been made on growth and development form definite contributions to the study of human constitution. The work of Crampton (6), Baldwin (7) and others, pointing out the frequent absence of relationship between chronological and physiological age is of great interest in this connection.

CLASSIFICATION OF HUMAN BEINGS BY DISEASE GROUPS

In any attempt to study living forms some system of classification is necessary. Heretofore most students of Man have used an arbitrary division based on two basic types—the long thins and short thicks. Naturally, there being no absolutism in nature, blendings of these two opposites occur in great number and variety of expression. It is not always easy to place a given individual definitely either among the longs or the dense. Consequently various intermediate groups have been formed. For these the French school have suggested the classic names respectively, Respiratory, Digestive, Cerebral and Athletic.

At the Constitution Clinic we have proceeded towards a classification by a somewhat different logic. We have felt that if a special type of human organism was essential to the development of a given disease, then the presence of that disease became evidence at once of the special constitution of its subject. The question of whether or

not this "disease race" method of classification has for the physician any advantages over the other "basic type" method appears to have been answered in a manner as unexpected as it is satisfactory. What seems to have happened is that having started to study the personality differences between members of various disease groups, we have come out at precisely the same point in classification of types as have all other observers of mankind. At least this is quite clear so far as the ulcer and gall bladder races are concerned. For the former is composed almost entirely of the long thins and the latter of the short thick. However, in respect of intermediary forms, we have been impressed by two very distinct varieties of influence which seem to mark individuals belonging to certain other disease groups. Such personalities as I have reference to cannot easily be classified at any point in the long thin-short thick series, nor, indeed, in any one of the aforementioned French classifications. So far as we can see these irregular forms which are, in themselves, quite sufficiently characteristic to be recognized over and over again, and therefore classifiable, are the products of two distinct aspects of the growth and development process. One group represents the various expressions of the gynandromorphic phenomenon—and of this we shall speak more fully in the next lecture. The other displays the effects of uneven growth and development rates between the different panels of the same individual. For example, one finds in frequent association with asymmetry of the maxilla, and irregular dentition, unusual extent of long bone growth and precocious intellectual development, but retardation of menstrual onset and restriction of the emotions at a very youthful level. The net effect of this type of variant is that of the tall, or well grown adolescent who looks and thinks older than his years, but because of retardation in emotional development cannot make ade-

quate social adjustments. Not only are such persons prone to become the subjects of certain definite diseases, which we shall publish in the near future, but they provide a most perplexing problem for schools. From the educator's standpoint these individuals present the difficulty which results from the discrepancy between physiological and chronological age already referred to. Quite another set of criteria are used in characterizing these forms than are employed to display the differences between members of the ulcer and gall bladder races. This circumstance would lead us to believe that we were dealing with totally different idiotypic patterns. Among ulcer and gall bladder patients the differentiating characteristics are quite clearly defined in all the panels. Only in our studies of the psychological panel have we been unconvinced that Kretschmer's view can be fully accepted. For while it is true that members of the ulcer race compare morphologically with his asthenic, leptothymic, and the "long thins" in general, we did not find that they showed schizoid trends. Nor did we find that the representatives of the gall bladder race with their pyknic bodies showed tendencies of a cyclothymic nature.

Now, if a human being should set out to study the universe he would doubtless begin the colossal task by charting the surface of the earth. Later he might examine the various compositions of soil and water, the movements of atmosphere and the central convulsions which lead to earthquakes; and finally he would attempt to comprehend those vast, imponderable forces which determine the relationship of his own to the other planets. The attempts of Man to investigate his fellows, so that he might better understand himself, have been almost identical with these efforts of the cosmographer. The primary studies consequently have been morphological. One has only to review the many classifications of Man

into types to perceive that his physical design has engaged the attention of anthropologists from the first. And those doctors in the past, and today, who have been as interested in the study of Man as in his diseases, have invariably sought first of all to describe or measure his form. With few exceptions all classifications of human beings today, are based on morphology. Hippocrates (8) stated that "Some are hollow, and from broad contracted into narrow; some expanded, some hard and round, some broad and suspended, some stretched, some long, some dense, some rare and succulent, some spongy and of loose texture." Since then, under a variety of names the two basic examples of mankind, the long and the dense have been heralded. One of the earliest workers in the field to attempt measurements was Johannis Sigismundi Elsholtzius (9) who, in the year 1654 at Padua, devised an anthropometric technique for clinical purposes. (Just two centuries later, in 1880, Achille de Giovanni (10), also Professor of Medicine in Padua, founded the modern Italian school of clinical morphological types. There were other observers, however, notably Jonathan Hutchinson (11) and Thomas Laycock (12) in Edinburgh who wrote in the early part of the nineteenth century upon the subject of diathesis, and the possibility of recognizing differences in the physical aspect of individuals suffering from various diathetic maladies. Since then an immense department of medical literature has been growing up about the creature Man.

In Italy, Viola (13) and Nicola Pende (14) have been carrying on and adding to the work of de Giovanni. In Germany, Martius (15), Fr. Krause (16), Julius Bauer (17), Kretschmer (18) have written extensively; while in America Bryant (19), Bean (20), Stockard (21) and others have made contributions. Sir Arthur Keith (22) in Great Britain has given a strong impulse to the study of

Man in medical circles, while Hurst (23), Ramsay (24), Ryle (25) and Garrod (26) have brought the studies forward in the clinic. In France, Sigaud (27) and McAuliffe (28) have developed the anthroposcopic

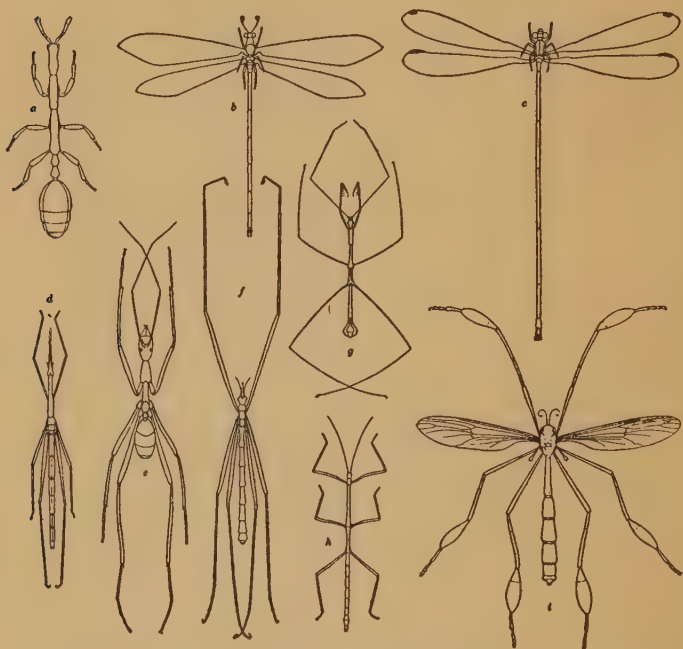


FIG. 4. Examples of asthenic insects belonging to various orders. *a*, Staphylinid myrmecophile (Coleopteron); *b*, ant-lion (Neuropteron); *c*, dragon-fly (Odonate); *d*, grasshopper (Orthopteron); *e*, ant (Hymenopteron); *f*, Panorpid (Mecopteron); *g*, bug (Heteropteron); *h*, Phasmid (Orthopteron); *i*, crane-fly (Dipteron). (After Wheeler.)

method rather more actively than the anthropometric. Now, so far as classification of types is concerned, the results of all these workers come to the same conclusion as did Hippocrates 2500 years ago—namely, that there are two root types of human beings, the long thins and short

thicks. At this point it may be enlightening to call attention to the interesting observations of Professor W. M. Wheeler (29) recorded in his delightful essay on the Physiognomy of Insects. In this paper Wheeler makes it clear that the same division into long thins and short thicks is to be found in the world of insects. (See figs. 4 and 5.) He prepares his readers for introduction to the insects by a masterly summary of the two human types. It presents the synthesis of soma and psyche with such clearness and insight that I shall quote it in full. He says: "The asthenic is pale, scrawny, longlimbed, with narrow head and face ("hatchet-faced"), long, narrow, straight nose, small, often receding chin, narrow chest and abdomen, deficient development of fat and musculature, reduced pilosity on the body but often with abundant cranial thatch, abstemious, dyspeptic, with a tendency to tuberculosis, and when insane, schizophrenic, i.e., prone to fixed ideas, ideas of persecution, etc. This type is active, intense, intellectual, self-centered (introverted), often deficient in a sense of humor, fond of reforming, dogmatic or fanatical, and not infrequently detestable when claiming a too intimate knowledge of the Almighty's plans for making the world safe for democracy. The pyknic—so called, not because he likes picnics, though no other type is so fond of them—but from the Greek word *πυκνός* meaning compact or thick set—is rubicund, rotund, large-bodied, short limbed, broad through the chest, but broader through the abdomen, with round or pentagonal face, pug or thick nose, moderately pilose, fond of eating and drinking, eupeptic, with a tendency to apoplexy and arteriosclerosis; on the mental side cyclothymic, i.e., predisposed to the recurring, circular or manic-depressive forms of insanity, such as melancholia; extroverted, socially easy-going, tolerant in morals and religion and often very lovable because claiming no inside information

in regard to the Almighty's designs." There is one detail of morphology which is not usually thought of as sharing in the characteristic differences of the longs and the

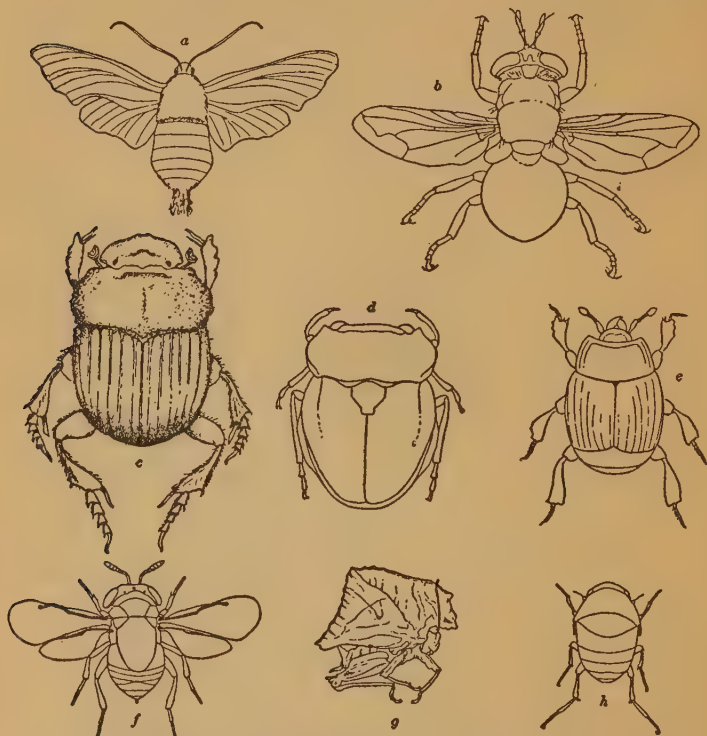


FIG. 5. Examples of pyknic insects belonging to various orders. *a*, Sphingid moth (Lepidopteron); *b*, Syrphid fly (Dipteron); *c*, Lamellicorn beetle (Coleopteron); *d*, bug (Heteropteron); *e*, Histerid beetle (Coleopteron); *f*, Chalcidid fly (Hymenopteron); *g*, grasshopper (Orthopteron); *h*, Phorid fly (Dipteron). (After Wheeler.)

dense. I refer to the design of the mandible. In figure 6 one may see the strong thickset right angled jaw of the gall bladder race opposed to the gracile, obtuse angled

jaw of the ulcer race. This structure presents also another point of interest, for it is the only skeletal part which displays no sex differences. The gonial angle varies greatly between disease groups, but in each group the male and female jaws are similar in form.

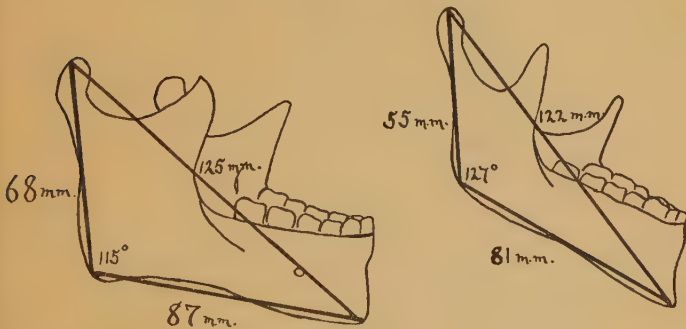


FIG. 6. Diagram of jaw types from the gall bladder and ulcer race. *a*, gall bladder race; *b*, gastric ulcer race.

It is, however, of great importance for the clinician to know much more about a man than merely the design of his external anatomy. The danger of morphological studies is that our cosmographer may remain a geographer and so forget, or fail to perceive the universality of his human subject. But if we remember the wise teachings of John Hunter and think always of the functional purpose of anatomical structure we shall hold a better direction. In his recent Huxley Lecture, and before this, in his splendid book entitled "Inborn Errors of Metabolism," Sir Archibald Garrod has directed attention forcibly upon the physiological personality of Man. By means of a number of examples of such hereditary phenomena as Friederich's ataxia, and pseudo hypertrophic muscular dystrophy—The "Abiotrophies" of Gowers—he points out the idiosyncratic character of what

he terms "tissue defects." Garrod feels that the term "tissue defect" is a broader one than Gower's "abiotrophy," and can be made to include a great variety of curious faults such as congenital haemolytic jaundice, otosclerosis, myositis ossificans, cystin urea, and the remarkable sex linked recessive haemophilia. At one point of his discussion Garrod writes "I have little doubt that as time passes the part played by hereditary chemical defects in providing the substructure of disease will prove to be much greater than, in the present state of our knowledge, it can be shown to be."

IMMUNITY

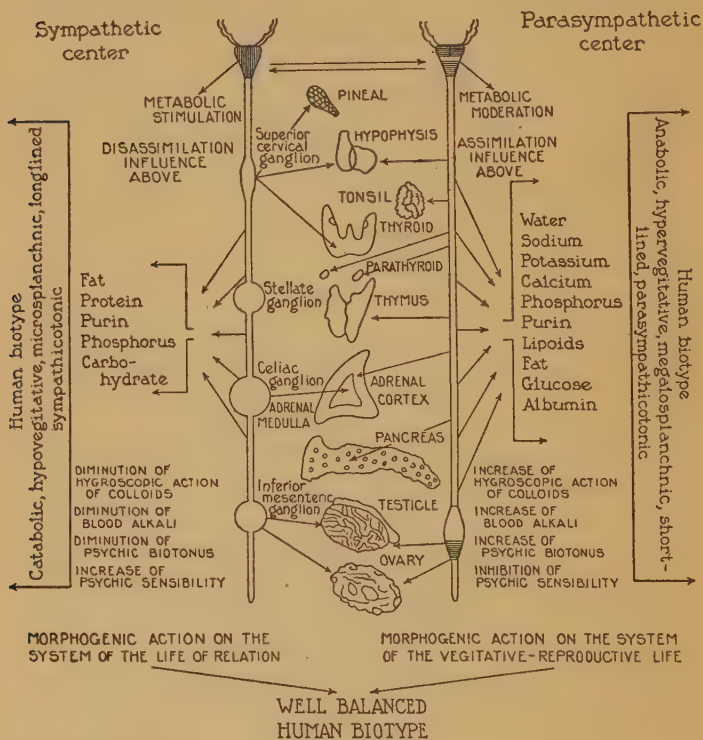
As yet we can only surmise that similar conditions exist in the field of immunity. Nevertheless everyone who has had experience with epidemic disease must be convinced that all degrees of reactivity from great susceptibility to complete resistance are to be found among the population in an epidemic area. Furthermore, there is no general practitioner who is not aware of the different powers of resistance among the several families he cares for. Now that such methods as the Schick, Von Pirquet and Dick tests are available, as well as the whole series of protein dermal reactions, it should be possible to make correlations of immunity characters with anatomical, physiological and psychological attributes.

THE PSYCHIC PANEL

But for the student of Man, as for the cosmographer, by far the most difficult aspect of his constitution to study and evaluate is that which is sensitive to the imponderable contacts with outer spheres—the psyche. It is this phase of the problem which I particularly wish to emphasize.

Ordinarily when we speak of the psyche, many people think of a more or less vague mental possession which is in some way related to thought processes and the spirit world. But the sense in which the conception psychic panel of the total personality is used in this discussion is quite different from that, and is sharply defined. We might, for example, think of the psyche as composed of one portion which represented the intellectual faculty, and another which was occupied with phantasy and emotion. Or we might typify the psyche in terms now so commonly used, "conscious" and "unconscious." But either of these modes leads us to an abstraction, any consideration of which must become purely philosophical. This would be perfectly satisfactory if man were simply spirit, for physicians then could work in the realm of pure thought. But we are faced with an animal possessing a very complex physical organization of which the psyche is an integral part. Consequently we must have a conception of the psyche which includes the physical. Now, if one considers the whole mechanism by which the organism perceives changes in its environment, and translates these stimuli into emotional states and intellectual formulation, it becomes apparent, in the present state of our knowledge at least, that something more than the somatic structure of nerve tissue is involved. We can trace this somatic phase continuously from the exterior through spinal sensory nerves, to the autonomic system and endocrine glands, that marvellous apparatus which stands at Man's psychophysiological border land (fig. 7). There, for the moment, our knowledge is arrested. But the end of this somatic phase is not the end of the individuality. Continuous with it, and as subtly, intimately entwined with it, as is an end organ with a muscle fibre, or an enzyme with the substances

it energizes, is the personal ego which embodies both the affective and effective consciousness of the individual. It is this continuity of body and mind, this fusion of psyche and soma which forces us to think of the animal



Af. Nicola Pende

FIG. 7. Diagram of the neuro-chemical regulation of individual personality.

organism Man as a totality or mindbody, in fact a psysome. From this standpoint then, all his reactions become psysomatic. Recognizing, however, that it is desirable to think of him as a complete entity, it is only possible to study him segmentally. It was for this

reason that the panel system of analysis with subsequent synthetic correlation was adopted.

While there is little doubt in anyone's mind that at present the most sensitive instrument for measuring personality is our intuitive sense, yet the intellectual faculty demands one by which the processes of reason can reach the same end. For this purpose there exist, in general, two methods of rational approach to the study of the psychic panel of a human being. One of these is by direct objective observation of personality traits, as demonstrated in gestures, attitudes and other forms of response to questions and problem situations. The other is by an analysis of the conscious unconscious mechanism. It is only possible within the scope of this review, to refer to the importance of these deeper psychological investigations of personality. One has but to think of the close relationship of the emotions and the organs equipped with non-striated muscle to realize how unique, for each one of us, are the processes of vital function. From these flow the transient and swiftly changing aspects of people; their subtle and poignant differences are like those in the wind blown foliage of oak and aspen.

So far our published studies (30) in the psychological panel have dealt only with the former method. But in approaching this phase of the subject of constitution, the great difficulty has been to devise a method which would enable the physician to catch and record the elusive quality of Man's personality, or psychic pattern. Obviously this is not a function which can be measured by instruments of precision nor encompassed by a mathematical formula. Yet personality is a force so powerful and definite that all the world is acutely aware of its distinguishing presence at every human contact. It is the most difficult quality of man to comprehend and in most descriptions its subtle essence is quickly lost.

Essentially the method consists of a combination of the subjective ideas of the patient and the observations of the physician. The results of this synthesis have been recorded upon charts similar to those devised by Blanton for the Minneapolis Child Guidance Clinic, and shown in figure 8. The first thing which strikes the eye on looking at these charts is that the arrows of the ulcer group for nearly every quality, point in opposite directions from those of the gall bladder group. Thus, for example, among ulcer people the quality of being easily stirred by fear is much more marked than it is among gall bladder people.

A clinical illustration of this point is to be found in the following case. A man of thirty-nine years of age of perfect ulcer race morphology was the oldest of five brothers. The father had been an outstandingly successful figure in a large manufacturing business. At his death the oldest son became the titular head of the family. While he possessed qualities of heart which endeared him to his friends, he had never been able to compete successfully with his father or brothers in intellectual activity. He had always been humiliated by his academic failures in early childhood. After the father's death it soon became apparent that this oldest son could not direct the business, and it also turned out that one of the younger sons, who was particularly well fitted for the work, became the active head. The chagrin which this turn of events caused the oldest brother was obvious and he suffered severely under it. Finally he withdrew from the family business and entered the field of public service. During his first year as a public official he still felt a sense of insecurity in the new work so that it remained a question whether or not he would be successful. But it happened that during those years he had two experiences which carried a serious menace to life. In the first instance, while

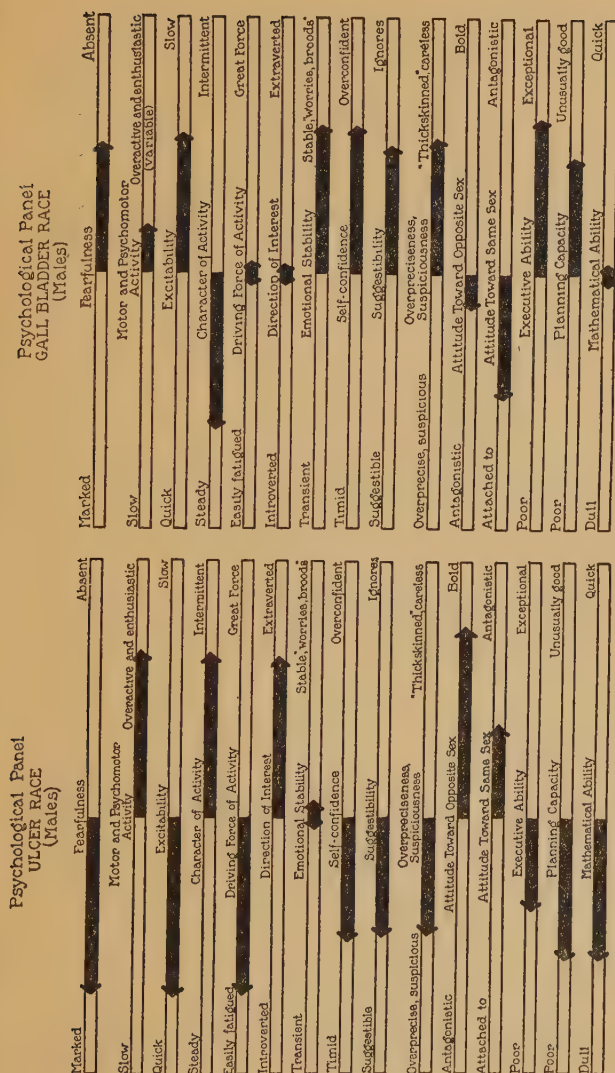


FIG. 8. Chart of difference between gastric ulcer and gall bladder races in the psychological panel.

driving his automobile along a narrow road through the woods he came suddenly and unexpectedly upon a railroad crossing and only just succeeded in escaping an approaching train. In fact the passage was so close that the tail light of his automobile was torn away. He said that his sensations, when he finally brought his car to a standstill, were those of complete exhaustion, breathlessness, rapid heart beat and active perspiration of the hands and face. It required ten or twenty minutes before he could again pull himself together and start the car forward. Within a few days following this experience it was necessary for him to make an aeroplane flight in connection with his civic duties. He had always been particularly fearful of aeroplanes, and during the period of anticipation and throughout the flight he suffered the greatest discomfort from apprehension. Two days following this terrifying experience he had a gastric hemorrhage from a duodenal ulcer, which the history, and size of the crater as indicated by the x-ray, proved to be of long standing. In the light of our present studies, this case assumes real significance, for it illustrates a situation in which, in an individual of a now well recognized type of constitution, a chronic duodenal ulcer is correlated with chronic fear, and the ruptured vessel in the ulcer with two acute fear shocks.

During the two years following the hemorrhage the patient did exceedingly good work and rapidly became a successful and highly respected public servant. Successive x-ray examinations showed a continually diminishing size of the crater and with one slight exception there was no return of indigestion. This exception occurred when the patient, travelling at sea, heard of the ruptured gastric ulcer of a fellow passenger. Within a few hours the old burning sensation in his stomach began again and continued until he reached home four days later. An x-ray showed then that his ulcer scar was still smaller than at the

previous examination. When the relationship of his revived symptoms to the affliction of his fellow passenger was pointed out his indigestion soon disappeared and he has been entirely well for a year since.

Returning now to figure 8, it will be observed that ulcer folk have an intermittent character of activity, whereas members of the gall bladder group tend to a steadier, more continuous form of behavior. The difference in self-confidence and timidity of the two groups is likewise marked. And so on through all the characteristics listed, one finds these diametrically opposed values. In general they seem to indicate that members of the gall bladder race are slow to react, little affected by fear, and display great stability of mood. On the other hand, the mood of ulcer people is far more unstable, but they react with great speed to their environment, and especially to fear. They are ideal opportunists and mental sprinters; and while they have little endurance, they are promptly rehabilitated by food, short periods of rest and the relief of anxiety. Throughout the studies we found that variations were much less marked in the intellectual faculty than in other aspects of the personality. The greatest differences lie in the zone of affective reactions or mood. This would seem to indicate that for the basic purposes of self-preservation and perpetuation the emotion-endocrine mechanism is a primary necessity and varies with subspecies. The intellectual or thinking equipment on the other hand, has little or no direct responsive relationship with environment, for it is not essential to life. Any variation which this function may present, therefore, is apparently a matter of degree rather than kind.

Clearly the study of human constitution is not an easy task. But it is a fascinating and profitable one, and to it should be brought the best thought which many minds can provide. Medical schools should see to it that students

are brought face to face with their ultimate responsibility, Man, in all his mystery and magnificence, before they are taught his diseases. For we shall never comprehend disease until we understand both factors which produce it—the external agent and the phenotype.

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PART II

THE INFLUENCE OF SEX IN DETERMINING HUMAN DISEASE POTENTIALITY

One of the most remarkable aspects of sex is that while its influence exerts profound changes upon the form, functions and psychological processes of living organisms, it is not essential to the life of the individual. Sex, for each species is the mechanism concerned with the passage, through successive generations of the stream of living protoplasm which carries the special insignia of race. Within this stream flow those idiotypic patterns which, when modified by the pressure of environment, express the constitution of the phenotype. Now even in such lowly forms as the metazoa, the sex or germ cells are early separated from the cells of the soma, and placed safely outside the destructive influences of somatic metabolism. The germ cells may not share in the life of the body, they are reserved for the immortal enterprise of passing on the racial protoplasm. The body cells wear out and die, and cannot reproduce themselves beyond the life span of the individual. But the germ cells are able to outlive the individual body by bridging the generations. This conservative vital principle is well illustrated in the diagrammatic representation of the cell lineage in the *Ascaris* (fig. 1). The germ line carries straight through interminably while the individuals of the species are thrown off on one side to work out their individual battles with environment. Thus, as Goldschmidt (1) puts it: "The sex cells are from the beginning to the end of their existence freed on behalf of the whole body from the consuming physiological activity of the somatic cells, and their activity is merely such as is proper to their own

metabolism." While, however, the isolation of the germ cells is very nearly complete from the destructive somatic metabolism, nevertheless in the higher animal forms at least, the sex gland where they lie intrenched, may produce profound effects upon the soma. It is for this reason that a review of some of the biological phenomena of sex is important to the study of human constitution.

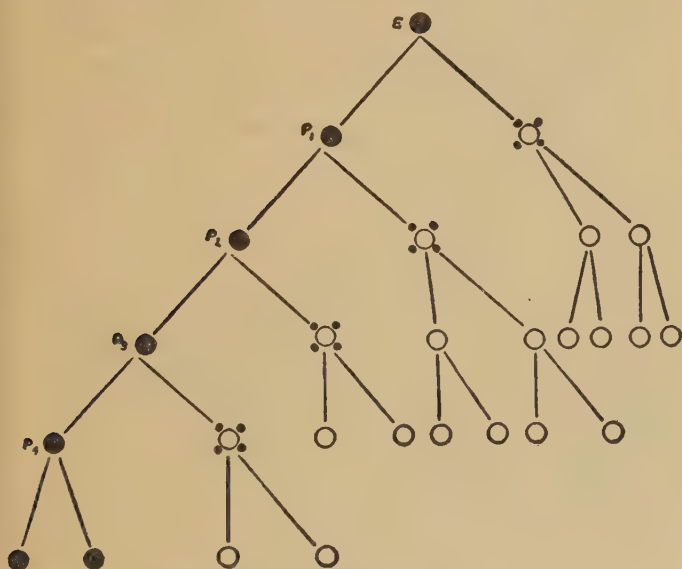


FIG. 1. Diagram of the cell lineage in the *Ascaris*. Black denotes the Keimbahn; white, the diminished somatic cells. (After Bover.)

SEX DIFFERENCES IN SOMATIC CELLS

Now, though the physical isolation of the germ cells would suggest that the highly specialized somatic cells were not involved in sex, yet this does not seem to be the fact. For sex differences are clearly apparent in the somatic portions of all bisexual forms. Indeed, these

various bodily insignia of maleness and femaleness may have no relationship to the sex gland. Meisenheimer (2), for example, has shown that in the gypsy moth, *Lymantria dispar*, destruction of the sex glands at a very early stage in the embryo has no effect upon the subsequent somatic sex characteristics. Furthermore, a male caterpillar, castrated early and then engrafted with ovaries still develops the normal masculine somatic markings. While this phenomenon is true of the insects it is not so in the case of birds and mammalian forms. In the latter groups it is possible to bring about various degrees of arrests in sex differentiation, and also reversal of sex by early castration and transplantation of sex glands. Two of the most remarkable examples of these effects are to be found in the Brown Leghorn and the Sebright Bantam fowls (figs. 2 and 3). Finlay (3) showed that in Brown Leghorns the replacement of testes by ovaries is followed by the plumage, comb and wattle form of normal females. But if females are ovariectomized, comb, wattles and spurs do not develop, but male plumage appears. In the case of the Sebright Bantam, Morgan (4) has shown that castration of the hen feathered, combed and wattled, male causes the bird to lose comb and wattles, and to develop the male type of plumage. Somewhat similar phenomena have been reported by Steinach (5) on rats and guinea pigs. When young males are castrated and ovaries engrafted there is a shift toward femaleness in the secondary sex characters and the genitalia undergo some retrogression. There is still another remarkable phenomenon in nature, well known to farmers as the free martin. This is the sexually incomplete or intersex twin of a pair whose other member is a male. The free martin occurs only in cattle and has been well described by Lillie (6) and others. Recently E. Schwartz (7) has reported a case of hermaphroditism



FIG. 2. Effects of gonads on secondary sexual characters in Brown Leghorn fowls. *a*, normal female; *b*, ovariectomized female; *c*, ovariectomized female with engrafted testis; *d*, female with ovary and engrafted testis. (After Finlay from the British Journal of Experimental Biology by permission of the Cambridge University Press.)



FIG. 3. Results of castrating hen-feathered males in Sebright Bantams. *a*, normal male; *b*, castrated male. (After Morgan by permission of the Carnegie Institution of Washington.)

associated with tumor of the interrenal portion of the adrenal gland. These cases are almost all in females and the subjects are marked by virilism and varying degrees of pseudohermaphroditism. In the discussion Schwartz refers to the free martin phenomenon and suggests that the influence of the maternal hormones may have some bearing on the faulty development of the foetal sex glands of the male. As a result of all these extraordinary facts about the variableness and interchangeability of sex forms, and especially from his studies of the free martin, Lillie believes that the determination of sex is not an "irreversible predestination but a quantitative over balance in the direction of one sex or another." Ordinarily, in the higher forms at least, we associate sex entirely with the gonads. From this standpoint, testicle and ovary epitomize the sex difference and their hormones determine the form and extent of the secondary sex characters. But there seems to be some evidence that sex may be something more than the presence of a gonad. Steche (8), for example, has shown in moths, by precipitin tests, that the bloods of males and females of the same species differ as much as do the bloods of individuals of the same sex of different species.

In connection with castration experiments, it is interesting to observe that in all species among vertebrates removal of the gonads produces far more extensive effects upon the male than upon the female. Furthermore, the castrated male takes on characters which in many respects are similar to the female. The obvious inference from these facts is that the female is less widely differentiated from the neuter or species type than is the male. This thought is given support by the single case of a true human neuter (lacking any gonad tissue) described by Pollailon (9). This unique individual possessed feminized habitus, sedentary tastes and the rather feeble personality com-

monly found in male castrates. Laurent (10) has also advanced the suggestion that femaleness is the expression of an arrested species type.

HUMAN EMBRYO HERMAPHRODITIC

The observations of Jordan (11) on hermaphroditism are interesting in this connection. He believes that the human embryo is originally potentially hermaphroditic and that the definite sex of an individual results from inhibition and, later, suppression of the opposite sex primordium. Just as types of metabolism underlying various characters and activities of the organism become represented in germ cells by parts of chromosomes, so grades of metabolism determining male or female sex are likewise represented. When the metabolism is of the male determining grade, the primordial germ cells differentiate into sperm; when the rate is of female determining grade, ova differentiate from the primordium. This conception receives considerable support from the now well-known fact that the basal metabolic rate at all ages is 2 to 4 per cent higher for males than for females. Furthermore, the probable relationship of different metabolism rates to the sexes is strongly suggested in an ancient observation of biologists which Doncaster (12) reflects in the statement that the egg is large, quiescent and stores up energy. The sperm, on the other hand, is small, actively motile and spends energy. These differences are, in general, characteristic of the sexes in almost all species. Geddes and Thompson (13) have expressed the same thought by saying that femaleness is correlated with preponderant anabolism, maleness with preponderant catabolism.

Obviously, if this increased metabolic rate is a characteristic of maleness, it must be effective very early in the life of the organism. For there seems to be little doubt

that sex is established perhaps at the first cell division, if not earlier, in either egg or sperm. Now if sex is thus early established, what happens at puberty? Clinical experience surely indicates that disease propensities are rearranged at the time of that episode. Is there a change, or merely an intensification of the sex quality throughout; or is there simply a completing of sex by the addition of sperm discharge and ovulation? And at the climacteric, is there a loss of each differential sex quality with a convergence again upon the basic species type? Such considerations of sex help us, perhaps, to understand the complicated problem of so-called sex intergrades. These may, for our clinical purposes be roughly divided into three groups.

- (a) The true hermaphrodites (very rare in humans) in which both ovary and testis is present in the same individual.
- (b) Pseudohermaphrodites (more common) in which the sex gland is either male or female, but the other portions of the genital tract are represented by parts of the apparatus of both sexes.
- (c) Gynandromorphs (very common) in which the sex glands and genital apparatus is definitely male or female and functions as such. But the somatic secondary sex characters present a more or less elaborate mosaic of male and female attributes.

Now this third gynandromorphic group, which displays the presence of femaleness within the male, and maleness within the female, has long been accepted by human beings. Its extreme forms have often been subjected to ignominy and ridicule, and its average examples, which include all men and women, have not always been recognized. The distribution of male somatic characters through the female and vice versa, is subtle, and unequal in the four panels (figs. 4 and 5). Thus a male may possess a projective and masterful psyche, have had acute poliomyelitis and strong muscles but present a form and

contours strongly suggestive of the female. Or another might have such a highly intuitive, impressionable,

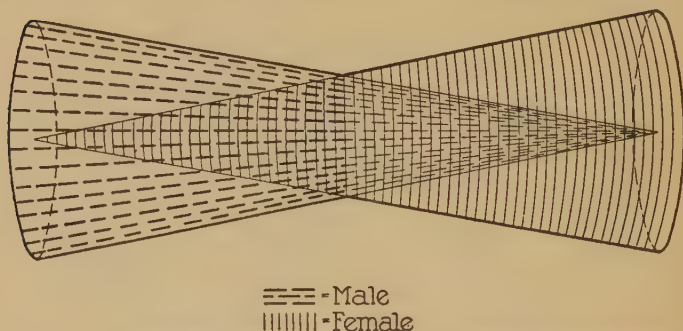


FIG. 4. Schematic cross-section of total personalities showing various degrees and distributions of opposite sex component.

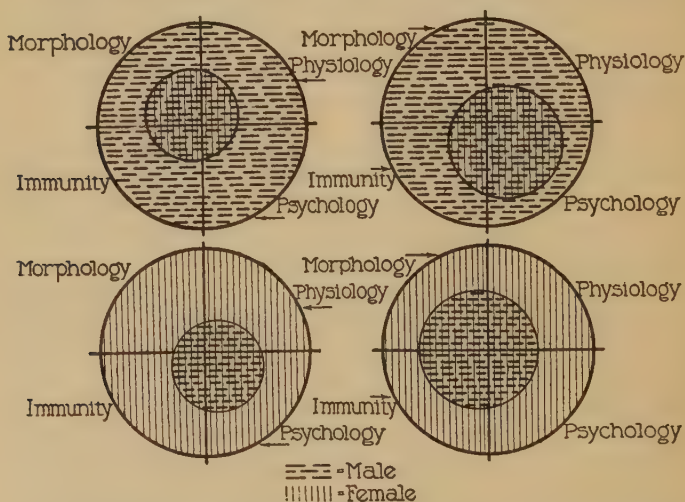


FIG. 5. Schematic cross-section of total personalities showing various degrees and distributions of opposite sex component.

sensitive, artistic psychic panel that his friends would call him effeminate notwithstanding his possession of a vigorous, athletic, masculine body.

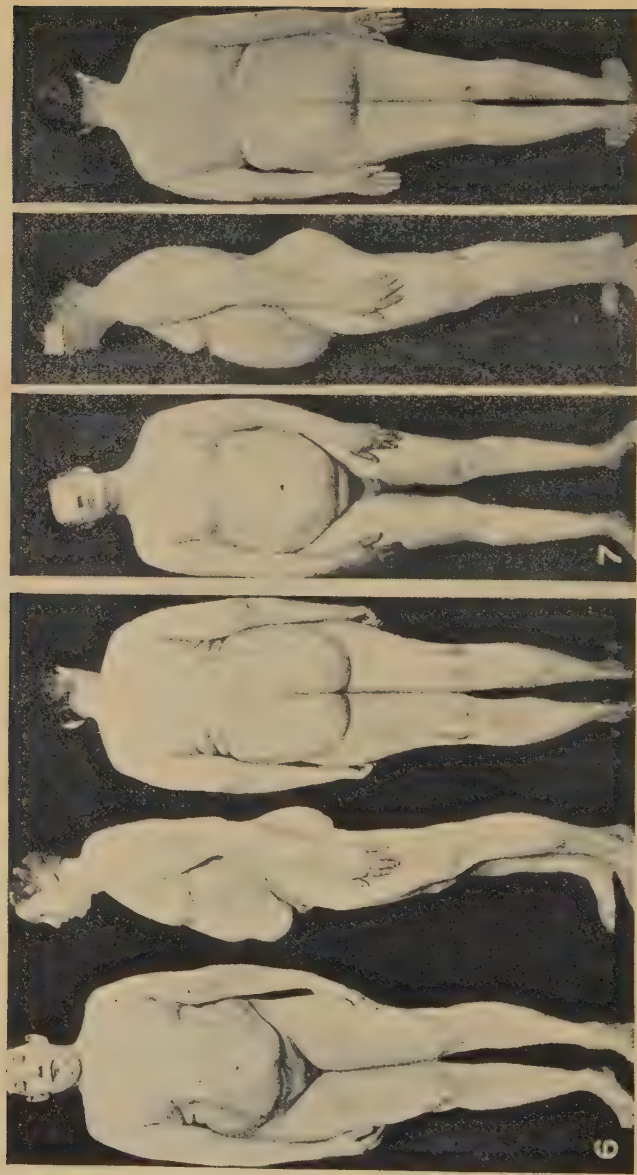


FIG. 6. Case I. Observe breadth of hips and feminine expression of face, genu valgum, and development of the leg at the outer side. Observe also the scars above and to the outer side of nipples, possibly the site of transplantings. Diagnosis: Eunuchoidism.

FIG. 7. Case II. Observe the less marked but similar outlines to Case I. Marked mons veneris, and development of calf to the outer side. Also the fatty tissue in the breast region. Diagnosis: Incomplete gonadal insufficiency.

GYNANDROMORPHISM

In order to illustrate the more elaborate forms of gynandromorphism the following four cases are presented. (Cases reprinted from the author's paper in Clinics of North America (14).)

Case I. H. A. Chief complaint: Lack of masculinity dating from boyhood. Father and mother medium-sized people. Five brothers and two sisters, all healthy; one brother has ten children. Up to age of seven or eight he was not so fat; after that he gained rapidly. Does not know about his dentition history. Began to notice small genitalia at age of ten years. Erections began about this time. Never had emissions, never intercourse, never masturbation. Psychic eroticism apparently neutrally directed, possibly a trifle toward the male. He objects to hearing men talk of their exploits with women.

Patient is never constipated. Appetite uneven; sleeps well, but dreams much. Patient is very unhappy about his condition. Has always been able to work—ship boy and cook—but has been forced to leave every job because of the tormenting jibes of his mates.

Had measles severely ten years ago; no typhoid, scarlet fever, or mumps. Tonsillitis three or four times.

Has had four operations. Incontinence, retention, undescended testis, perforation of abdomen from pulling on a nail, followed by peritonitis, appendicitis.

Two years ago was knocked unconscious—probably fracture of skull; has had headaches since, no dizziness, made worse by worry or excitement.

No eye symptoms. Both ears discharged for many years. No deafness. Bowels always regular.

Patient weeps easily, reaches for the examiner's hand, and all gestures and expressions are feministic.

Eczema of neck and ear; herpes of lower lip.

Tongue large, smooth, red; no tremor.

Teeth, few remaining, in bad condition.

Lungs clear, heart negative.

Abdomen, many scars of operation.

Massive fat.

Genitalia: Penis 3 cm. long; 1.5 to 2 cm. in diameter.

Reflexes sluggish.

Voice, soprano.

Discussion. This case, then, presents the following characteristics: Enormous adiposity associated with slightly above average height, but the length of the extremities is greater than that of the trunk. Thus in the general conformation of the body are found the characteristics described by Tandler and Gross as typical of the castrate. These authors describe two forms in which the castrate appears in about equal frequency: (1) greater than average height, rather spare, and with the fixation of certain infantile characteristics, the most striking of these being the child voice and the preservation of the flat lumbar region due to the untilted pelvis found in childhood; (2) the other type possesses all these characteristics and, in addition, a typically disposed and marked increase of subcutaneous fat. Furthermore, they point out that in the male castrate the skeletal changes are not essentially toward the female type of skeleton, but toward what may be termed a less definitely masculine skeleton. In female castrates there is a similar modification of the skeleton away from the characteristically feminine form. In other words, the skeletons of castrates of both sexes converge toward what may be called a neutral form, sometimes considered to be the pure species form of skeleton, uninfluenced by secondary sex attributes. The outstanding features of these changes are the greater length of the extremities and trunk, and the greater width of the pelvis in relation to the shoulders.

It will be observed that this patient presents an extraordinarily wide pelvis and that the disposition of fat is feministic. Furthermore, there is a definite genu valgum, and the bulge of the calf of the leg is distinctly to the outer side. Consequently, there seems to be a suggestion

that in this individual there is something more than the simple reversion to a pure species type of skeleton; indeed, that there may be definite feministic traits.

PSYCHE FEMINISTIC

In this connection it is interesting to consider for a moment the psyche of the individual. He is extremely emotional; tends to apply for advice and help to any one who shows the slightest willingness to listen to his troubles, and reaches out for the hands of his hearers. These he takes impulsively, and with tears in his eyes beseeches assistance and sympathy. Furthermore, he cannot abide listening to the rough talk of his shipmates when they tell of their exploits in venery. He says he cannot hear women spoken about in such fashion. In every respect, therefore, the patient presents a strikingly feministic psyche. It has been difficult to determine to which sex the individual's eroticism belongs, but the impression has been gained that it is very moderate or almost absent, though, if anything, slightly directed from the female toward the male.

From these considerations we are justified in concluding that this individual at all events can be compared very accurately in most details with the second type of castrate, according to the description of Tandler and Gross. Whether or not the greater indications of feminism which this individual presents justify us in assuming the presence somewhere along the genital tract of ovarian rests is open to question; but it seems highly probable. The patient himself states that he was aware of genital inferiority at the age of ten. Furthermore, in the absence of any positive mumps history we are inclined to the conclusion that he is a true example of congenital gonad insufficiency—the classical eunuchoid.

Whether or not this individual could be metamorphosed

by a successful transplantation of testicular tissue is open to question. If he does possess ovarian rests, testicular transplants would fail, according to the experiments of Steinach. It has been impossible to get any information about the symmetric wounds over the breasts, but one cannot help hazarding a guess that they represent an attempt at transplantation.

Case II. T. C. Male, aged forty. Italian. Chief complaint: Constipation. Father a large man. Mother very stout. Brother and sister both fat and healthy.

Patient does not know whether he was a large or small baby. Was "skinny" at six to seven years. Average size as youth. Began to get fat sixteen years ago (at twenty-four). Never had any pubic hair till thirteen to fourteen, then very scant. Knows nothing about dentition, but never had trouble with his teeth.

Patient has always had tendency to constipation. At sixteen years of age had very bad attack of intestinal catarrh, with terrific constipation. Many nightly emissions. Since seventeen to eighteen years almost every night. For past five years constipation very bad and has tried all kinds of medicine. Now is taking 3 grains pituitary extract daily, and is better, he thinks. Patient thinks he passes a good deal of water. He gets tired easily. He has had a sort of headache across the forehead for a long time, lately it has been rather more intense. Sex activity considerable from twenty to thirty. Lately some diminution both in libido and potentia. Appetite poor. Does not sweat much. No hives.

Patient had orchitis at eighteen—not gonorrhea. This he had at age of thirty-three. No measles. Pneumonia at nineteen. No scarlet fever and no diphtheria. Sore throat once a year.

Metabolism determination, November 15, 1920 plus 8 per cent.

X-ray report, December 6, 1920: Sella is long, no flattening of the clinoids, no erosion. No indication of increased intracranial pressure.

Discussion. This patient is a distinctly successful individual in many respects. He is very clever and purposeful in his business dealings. Notwithstanding the absence of virile physical secondary sex characteristics, masculine eroticism is highly developed and potentia is

considerable, possibly a little greater than average. He feels muscularly strong and has no complaints, save his obstinate constipation. Certain features in this patient's anatomy are interesting from the point of view of their comparability with similar points in the acromegalic. There is great prominence of glabella, with unusual breadth of nose bridge, and the interpupillary distance is wide, 7 cm. The thorax is deep and short, and its subcostal angle wide with a large ensiform. Furthermore, as in Case I, this patient's lower extremities are longer than his trunk, and his span exceeds his height, features which seem clearly associated with increased activity of the pituitary gland when there is gonadal inadequacy in early life. It is quite evident, however, that if the castrate length growth phenomenon is due to the removal of testicular influence, there must be one specific activity of the gland concerned in the process. For in both Case II and Case III, notwithstanding the presence of this phenomenon, the adiposity and scant hair, there exists an unusually active libido and potentia.

Another question which likewise will bear consideration is that of adiposity and feminine contour. All cases of the type under discussion develop the characteristic contour which is commonly associated in everyone's mind with feminism. But women develop an identical adiposity which is more than an exaggeration of the accepted female form—it is an actual difference. Is this adiposity found both in women and men, perhaps a neutral characteristic, and like the skeleton of the castrate, a form which tends away from sex toward species? In this connection it is helpful to remember that in aged persons of opposite sex there is a convergence of habitus not only of the body, but of the mind—the exact reverse of the divergence seen in adolescence.

Therapeutically, Case II has offered a most difficult

problem. On large doses of pituitary and thyroid extract he has felt much stronger and more active. But there has not been the slightest influence upon his constipation. Nor have any of the usual methods of treating chronic constipation been of service.

Case III. Aged thirty-seven. Male, Weight, 218 pounds. Height, 6 feet $1\frac{1}{2}$ inches. Chief complaint: "Nagging affair in here" (pointing to his right groin). Doctor told him a chronic appendix. Also more or less trouble with intestines. Some constipation tendency.

He has depressed fits, thinks everything is wrong, and a sort of apprehension—fear of impending troubles—these occur at irregular intervals, he is dizzy with them—no headaches. As a boy had many "sick headaches" between ages of eleven and twenty.

Patient was a thin boy, grew 6 inches in his fourteenth year. Long and thin. Impacted wisdom teeth. Began to put on weight at twenty, changed his type then. Married at twenty-four years and gained more weight promptly.

As a boy he noticed at the age of eleven that his right testis was lacking. Thinks size of genitalia is below average. Libido average, potentia rapid. Married twelve years, no children. Examination of semen two to three years ago revealed inactive spermatozoa.

Bowels always have tendency to constipation. Notices some days when he has urinary frequency. No cardiac or respiratory sensations. Fatigued rather easily by nerve strain. Physical exercise makes him feel well.

Measles and mumps at fourteen, both parotids and also in one testicle. (This preceded his sudden growth. N.B. Was the one active gonad destroyed and so with its influence removed, the pituitary stimulated length growth and subsequently fatigued with weight increase?) Scarlet fever, chicken-pox, no diphtheria, tonsillitis—partial tonsillectomy, no malaria, typhoid, or pneumonia.

Patient is not musical. Likes sweets. Not much ambition. Not especially keen about his work, likes to be given a definite job which he understands, then he can go ahead and do it, but if he gets up against a new thing which he does not understand he gets nervous and fligidity.

Dreams that he has gotten up to his last year in college and

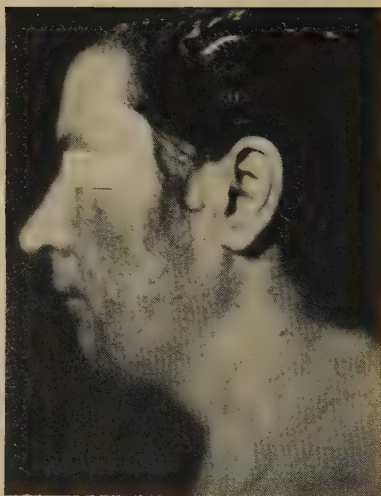


Fig. 8. Case II



Fig. 251







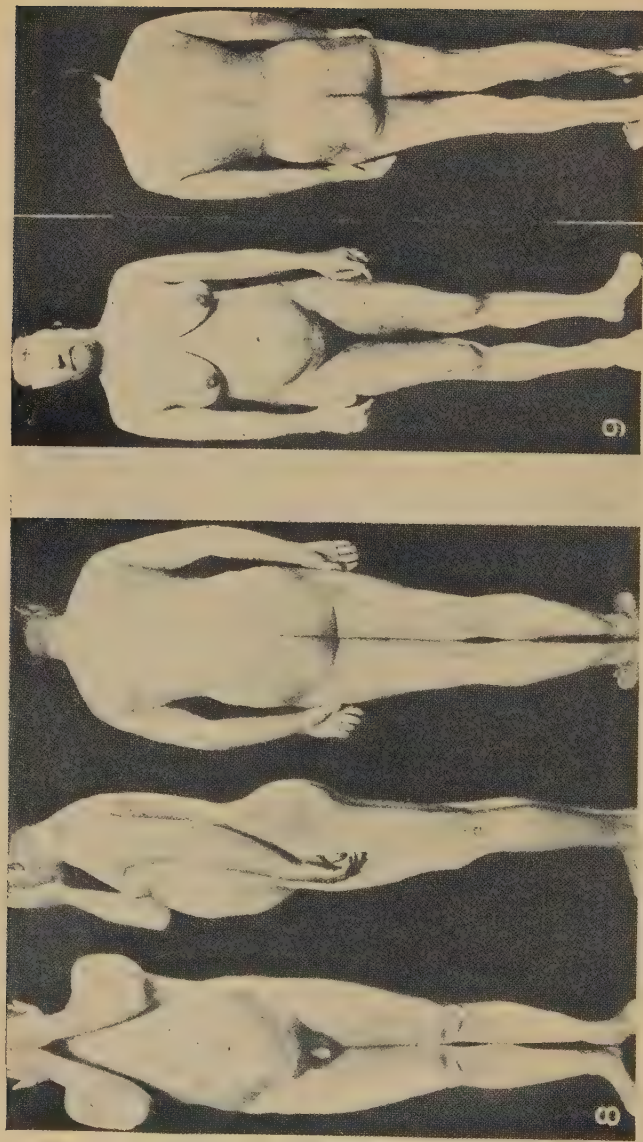


FIG. 8. Case III. Observe the much greater straightness of line than that found in Cases I and II, much more vigorous position in standing, and masculine curve of the hand. Also observe hair on inside of thigh running into the groin. Diagnosis: Left testicular atrophy. Right cryptorchidism.

FIG. 9. Case IV. Observe enormous breadth of shoulders, narrow hips, and masculine contour of legs. Note the hair on thigh, continuous with the pubic mass. Also note pigmentation and masculine way of holding hand. Diagnosis: Virilism. Double adrenal tumors.

then can not get past the final examinations. Always gets that far and then can't get past that point. This is a repeating dream. Rather sluggish, heavy "fat brain."

Physical examination: Well-developed *mons veneris*. Deep oval cleft at root of penis. Small external genitalia. Short scrotum. Left testicle present, but atrophied. Testicular sensation is preserved. Right testis is absent from the scrotal sac. Just above Poupart's ligament on the right there can be felt in the iliac fossa an elongated oval mass which on pressure feels elastic and tense. The patient complains that pressure on this mass produces typical testicular pain. Undoubtedly this is the undescended testis and is the structure which accounts for the uncomfortable sensations in this region which have been looked upon as chronic appendicitis.

Basal metabolism determination, plus 17 per cent.

X-ray of head: The radiograph examination of the head shows a skull evidently of the mesocephalic variety, having a normal calvarium, both in thickness and contour. There is no evidence of increased intracranial pressure. The posterior occipital protuberance is somewhat prominent.

There is a slight area of calcification in the ligmentum nuchae, separated from the protuberance. There is no separation of the sutures. The sella is small and almost completely closed in. The floor is clearcut and shows no evidence of erosion. The dorsum has a rather heavy tip. The ethmoid cells are clear.

The entire examination, aside from the small sella, which is in this case perhaps of little significance, shows no evidence of intracranial pathology.

The radiographic examination of the hands shows a few quite small spicules about some of the joints. Most marked in the first joint of the right thumb, and the terminal joint of the right small finger. The bones themselves show no abnormality. The tufting of the terminal phalanges is perhaps slightly more pronounced than is normally seen.

Summary: This patient presents a very interesting picture of an individual who started out with a genital tract developmental fault. At the age of fourteen an attack of mumps destroyed the descended left testicle. During the year following this attack the patient grew 6 inches in length. While the external genitalia are small in development the secondary sex characteristics are largely of the reverse type in the anatomic panel. It is interesting that the psyche and the sex eroticism is of the masculine type

and active. It is highly probable that the interstitial portion of the undescended testis is adequate. It will probably be unwise to interfere surgically with the undescended testis.

Discussion. This patient is almost a successful male individual. From the point of view of his anatomy, however, he presents characteristics of a similar, though less extreme nature to those seen in Cases I and II.

He is above the average height; the extremities are greater in length than the trunk; and the pelvis approaches the shoulders in width. Furthermore, there is a superabundance of fat disposed along lines similar to those of Cases I and II, but less sharply localized. It is more a general increase of subcutaneous fat, with very subtle accentuations in the areas which are so extremely marked in Case I, the pathologic type.

Now Case III is of peculiar interest because the striking secondary sex characteristics—the voice, facial hair, mental vigor, masculine psyche, muscular strength, and male sex eroticism—are all present. This is so notwithstanding the fact that the individual has serious gonadal faults. In the first place, he was born with a congenitally undescended testis on the right; and, in the second place, at the age of fourteen an attack of mumps completely destroyed the left descended testicle. During the year following the attack of mumps the boy grew over 6 inches in height. In this phenomenon there is an analogy to the length growth of the castrate.

It is accepted as the result of experimental and clinical observation that the pituitary gland increases in size and activity following removal of gonadal influence, and so we see in the circumstances of rapid growth following the attack of mumps an analogous phenomenon. In the case of the castrate, however, there is, in addition to the length growth, the complete absence of secondary characteristics. But in this patient there was an undescended



FIG. 10. Same patient as figure 9 showing facial and chest hair distribution.
 FIG. 11. Illustrating the strong emphasis of effeminate component in the gynandromorphic mosaic of a male with gall bladder disease. Note rounded contours, breast development and facial expression.

testicle which escaped the mumps infection. This gland can be felt easily in the right flank, and unquestionably has saved its bearer in precisely the same way that the successful testicular transplant does in the experimental animal castrate.

It is interesting to observe that in all these 3 cases— notwithstanding the general heaviness of build and breadth of face—the palatal arch in each individual is high and narrow and that the dental arch is a very narrow or pointed oval. In Case I the teeth are absent, so that their arrangement cannot be described; in Case II close set and even, but in Case III there is a congenital absence of both lateral incisors. Some recent authors have maintained that absence or irregularity of the lateral incisors is always associated with a gonadal fault. Such a generalization is not justified at present. Yet there are very many individuals in whom the two phenomena are present.

All three of these cases present great similarities in habitus and all present certain gonadal faults. All have, besides, characteristics which are analogous to many changes found in the acromegalic. All three, furthermore, show a well-marked white line of Sergeant. While there is no definite proof of the significance of this line, it seems to have some relation to insufficiency of the adrenal glands. This phenomenon will be referred to again in connection with Case IV.

Case IV. Chief complaints: Pain in the upper epigastrium and lower abdomen for a year; character, burning, continuous, no variation, no relation to meals; nauseated, but no vomiting with the pain. Previously before pain began she used to vomit three to four times daily. Vomitus never bloody.

About two months ago she began to have pains in the lower abdomen, most marked in the suprapubic regions, and burning on voiding urine. She had hematuria for a month about five months ago; then dysuria, nocturia, and general frequency.

Has lost 27 pounds in the past year; fatigues easily and feels weak.

No previous serious illness; no operations; no respiratory or cardiac symptoms. Always constipated.

Skin has become darker in the past year and a half. The hair on face and body began two years ago; has always had hair on arms.

Married. No children; one pregnancy, miscarriage from strain at laundry work.

Menstruation began at nineteen years of age. At first, very irregular, three to six months interval; duration of each period, one week; no pain. Miscarried at two and one half months. Married second time seven years ago. Intercourse normal.

Physical examination: A pimpled, hairy, oily skinned, middle-aged woman. Marked tremor of extremities, and often of head and body. Mask-like face.

Eyes: Pupils not regular; react normally; irises of different color. Fundi normal.

Mouth: Tongue coated and tremulous. Teeth, pyorrhea. Tonsils, small, reddish.

Heart and lungs negative. Blood pressure: 148 systolic.

Abdomen: In each flank, deeply placed in the kidney region, there is felt a small hard tumor which slips easily under the fingers; too deeply placed to be accurately defined.

Reflexes: Tendon reflexes everywhere markedly exaggerated.

Pelvis: Introitus admits two fingers; no tenderness in fornices. Uterus small, round, in midline and anteflexed. Cervix long, moderately hard; no masses; moderate leukorrhea.

Bladder: Cystoscopy negative. Some bright blood with urine from right ureter. Examination for tuberculosis negative.

X-ray of kidneys: Shows nothing.

X-ray of sella: There is some vagueness and irregularity of dorsum and floor of sella, which is itself of rather large size.

Basal metabolism: plus 6.

Case IV presents a very striking picture of virilism in the female. The outstanding features of the case are, first of all, the preservation of the infantile trunk extremity relationship, namely, the trunk length greater than the extremity length. The shoulder width, which is enormous, is much greater than the pelvic width, and

all the vertical lines of the body tend to straightness rather than to curves.

WOMEN MATURE EARLIER THAN MEN

In connection with the trunk extremity ratio it is of interest to call attention to the observations of Tandler and Gross in their discussion of the castrate. Just as the reverse ratio is characteristic of early removal of sex gland influence, so also is the ratio of the present case found in association with early sex ripening. These authors point out that women in general arrive at maturity earlier than men, and that, in general, the trunk extremity relationship in women is that of long trunk and short extremities. They further point out that the races inhabiting southern Europe, whose age of sex ripening is characteristically young, preserve this trunk extremity ratio; whereas, the races of northern Europe, in which the sex ripening is later, present the reverse characteristics in association with greater total length.

While the breasts of this patient are of normal female character, the conformation of the extremities, especially of the legs below the knees, is just as characteristically masculine, the calf being developed more to the inner side of the midline than the outer.

The excessive hair and its distribution in this individual is another striking feature. The distribution is typically that of the male, and the increasing facial hair has already gone beyond the point so frequently seen in elderly females, and is approaching the true masculine facial growth.

A great deal of stress in the discussion of hair distribution is laid upon the suprapubic arrangement as differentiating sharply the male and the female; the transverse upper border of the crines being considered feminine; the pyramidal masculine. As a matter of fact, there is no

such final and sharply marked line of differentiation, the two types of upper margin frequently merging very subtly one upon the other. Another feature of the hirsute arrangements in the pubic region which is perhaps more characteristic of the different sexes is found in the angle of the groin. The typical feminine arrangement presents absence of hair in the groin continuous with the bare thigh; whereas the typical masculine arrangement displays a continuity of the thigh and pubic hair through the angle of the groin.

As far as secondary sex characteristics are concerned, this patient presents the boyish form and the masculine hirsutes. The trunk extremity ratio indicates an early awakening of the gonadal influence. Suspicion was entertained that she might be an example of pseudo-hermaphroditism. The external genitalia, however, are perfectly molded and the pelvic examination reveals a normal uterus. Furthermore she had been pregnant.

There follows another group of phenomena which must be considered in connection with the foregoing, but which does not belong in the category of the secondary sex characteristics. These are: (1) pigmentation; (2) the absence of the white line of Sergent; (3) gastric hyperacidity; (4) muscular weakness and tremor; (5) the tumors in the flanks.

The first four are, in a sense, mutually paradoxical, muscular weakness, pigmentation, and gastric hyperacidity are usually associated with insufficiency of the adrenal gland, for they are to be compared with the classical symptoms of Addison's disease. But the absence of the white line is difficult to explain unless it be associated with the well sustained blood-pressure. It may be remarked that while the patient complains of muscular weakness, there is an intense vigor in all her motions as well as a generalized tremor, which gives the impression of a sthenic state of the whole neuromuscular system.

The fifth phenomenon in this group is that of the tumors in the flanks. In 1912 Alfred Gallais described at length a condition which he termed the "genito-adrenal syndrome." In this communication he reports a number of cases from literature and several from his own observations. The descriptions of his cases and their photographs are extraordinarily like that of this case. As the result of his observations the point is made that there is a sharp distinction to be drawn between pseudohermaphroditism (in which the external genitalia of one sex are found with the internal genital organs of the opposite sex) and the appearance in an individual of one sex of the secondary sex characteristics of the opposite sex. The patient under consideration (Case IV) displays the latter condition. Unquestionably, she possesses congenitally faulty ovarian glands because her menstrual function was delayed until her nineteenth year and never attained regularity. Nevertheless, the ovaries were sufficiently developed to permit impregnation and, so far as can be determined, successful gestation up to the second or third month, at which time an abortion resulted from physical strain. She presents, however, late in life secondary sex characteristics of the opposite sex. In association with these secondary sex characteristics are also found signs pointing to disturbance of the adrenal function—the tremor and asthenic muscular state, the maintenance of blood pressure at a slightly elevated level, and the appearance of pigmentation. The position of the tumors, highly placed and deep in each flank, established the diagnosis almost beyond peradventure.

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ADRENAL CORTEX AND GENITAL APPARATUS

Speculation as to the mechanism behind the symptomatology of these cases leads at once to a consideration of the association of the adrenal cortex to the genital ap-

paratus. It is well known that in the developing embryo the primitive cell streak which ultimately forms the ducts of Muller and of Wolff, provides also the cells from which springs the adrenal cortex. Embryologically, therefore, the association is close. In most of the cases described by Gallais there is always a period of great physical vigor, undoubtedly associated with the early stimulating presence of the cortical tumor. As the cases progress this stimulation phase passes gradually over into one of adrenal failure. These tumors are very much more common in females than in males, and the change in the secondary characteristics is always toward virility. In young males and also in young females such cortical tumors are frequently associated with precocious development and hypergenitalism. This group, of course, includes the well-known instances of the "Infant Hercules," one of which has recently been reported by Gordon and Browde (15).

When we consider these extreme, and faulty expressions of nature's effort at sex differentiation, it is less difficult, perhaps, for us to recognize those subtile analogies of form and psychic pattern which mark every member of the human race with a bisexual stamp. They form not only an essential part in any discussion of the general biology of sex, but lead us naturally to a consideration of the clinical importance of the sex factor in man's constitution.

CLINICAL SECTION

From the standpoint of their greater susceptibility to disease males seem to surpass females. This masculine failure has been recognized always and has been much discussed in the literature. Moebius (16) believed that the discrepancy was due entirely to the greater hazards of life, including alcohol and venery, to which males were

exposed. But this simple explanation is not altogether satisfactory. Whether or not the sex ratio is conclusive evidence, it nevertheless indicates suggestively, that males have far less chance of survival than females. Thus it has been shown that there are 160 male abortions for every 100 female; 130 male still births for every 100 female; and 104 to 106 male living births for every 100 female. But at the end of the first year, for every 103 females living, there are 100 males.

There is also another way of looking at the question. If, for example, we should group diseases in various categories related to the sex of patients we should find some curious and unexpected facts.

A first group might be made of those maladies in which the differences of incidence between the sexes depended definitely upon the greater exposure of the male to all the more hazardous environmental influences. Such a list would include, for example, traumatic accidents, diseases from exposure to dust and chemicals, pneumonia, typhoid fever, dysentery and nephritis. A second group of diseases in which the difference of incidence in the two sexes is not so clearly due to the greater life hazards of males, might for example, include whooping cough, influenza and cancer. These are more frequent in females, whereas acute poliomyelitis on the other hand is commoner in males. In connection with influenza in women it is interesting to recall not only the remarkably close association between the onset of the attack and the menstrual period, but also its devastating effect during pregnancy.

A third group might be formed of those diseases which are definitely hereditary and display the peculiar phenomenon of sex linkage. The following conditions reported by Loughlin (17), Davenport (18) and others are dominant in males and recessive in females: Coloboma, color blindness, night blindness, nystagmus, ichthyosis, multiple

sclerosis, haemophilia, webbed toes, Gower's muscular atrophy.

Still a fourth, and perhaps the most illuminating way of classifying diseases according to its different sex distribution, is the simple one of two columns (see pages 48 and 49), one of which includes those maladies more frequent in the male, the other those commoner in the female. For example:

Males (21 diseases)

Pneumonia.....	5 to 1
Cerebro spinal meningitis.....	Slight
Amoebic dysentery.....	15 to 1
Poliomyelitis.....	Slight plus
Diabetes.....	3 to 2
Gout.....	40 to 1
Scurvy.....	Greatly plus
Gastric ulcer.....	4 or 5 to 1
Acute pancreatitis.....	Large majority
Bronchial asthma.....	More often
Sero-fibrous pleurisy.....	4.8 to 1
Pernicious anemia.....	2 to 1
Leukemia.....	More often
Hodgkins.....	More often
Tetany.....	2 to 1
Haemophilia.....	100 per cent plus
Angina pectoris.....	6 to 1
Addison's disease (muscular power).....	More often
Bant's disease.....	More often
Alcoholism.....	6 to 1
Tabes.....	10 to 1
Paresis.....	Much more
Progressive brain paralysis.....	More often
Syringomyelia.....	2.3 to 1
Cerebral haemorrhage.....	Greatly plus
Sciatica.....	Greatly plus
Paralysis agitans.....	Greatly plus
Pseudohermaphroditism (2,000 cases).....	10 to 1

Females (20 diseases)

Diphtheria.....	Slight plus
Influenza.....	2 to 1
Whooping cough.....	1.25 to 1
Rheumatic fever.....	Considerably plus
Tonsillitis.....	Slight plus
Pellagra.....	Slight plus
Obesity.....	Considerably plus
Gall stones.....	3 or 5 to 1
Movable kidney.....	7 to 1
Chlorosis.....	100 per cent plus
Goitre (exophthalmic).....	6 or 8 to 1
Myxoedemia.....	6 to 1
Hyperthyroidism.....	12.5 to 1
Acromegaly.....	More often
Multiple sclerosis.....	More often
Combined sclerosis.....	More often
Korsakoff's syndrome.....	2 to 1
Chorea.....	2.4 to 1
Purpura haemorrhagica.....	4 or 5 to 1
Migraine.....	6 to 1
Raynaud's disease.....	1.5 to 1
Arthritis deformans (menopause).....	4.4 to 1
Hysteria.....	7 to 1

Now it will be observed that diseases of rather different mechanisms appear in the two lists. Thus, males are more susceptible to most infections, especially pneumonia and pleurisy, pancreas and adrenal disease, vascular disease, gout, muscular dystrophies, spinal cord tract disease and blood dyscrasias. With the exception, perhaps, of the infections, these are maladies involving all the mechanism for energy expenditure. Females, on the other hand, besides the interesting and unexplained greater susceptibility to whooping cough, influenza and rheumatic fever, show more susceptibility than the male to the endocrinopathies, diffuse cord lesions and functional nervous disorders, arthritis deformans, gall stones and obesity. In general, this group of diseases involves the protective and energy accumulating mechanisms.

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DISEASE INCIDENCE IN SEXES

In the light of these observations and those discussed earlier, it may be of interest to attempt a somewhat more critical analysis of some of the diseases whose incidence differs among the two sexes.

Diabetes mellitus. The frequency of diabetes mellitus is somewhat greater in males up to the age of forty-five, or until maleness begins to wane. From forty-five years on females display greater numbers. This would suggest a susceptibility factor in femaleness. But if the two sexes converge after the climacteric toward a common species type, why should waning maleness result in greater resistance to the disease than waning femaleness? An answer to this question may be found in the theory which Emerson and Larimore have advanced that hard physical work is a protection. The muscular indolence of women, as well as their overfeeding after forty-five, is a well-known situation and may account for their greater susceptibility.

Gall bladder. Female preponderance 3 or 5 to 1. This is practically the reverse of the situation found in gastric and duodenal ulcer. While it might be possible to ascribe the far greater incidence among females to their habits of over eating and insufficient exercise, there are certain reasons for believing that other factors are at work. For example, the males who develop gall bladder disease, especially cholelithiasis, present definite feminized trends in various phases of their constitutional plan. Thus, in addition to an actual pelvis width, as well as a pelvic-shoulder breadth index which is greater than that found in males of all other disease races, there are also feministic traits of gesture and psyche. Such males may be perfectly adequate sires, but none the less present definite feminine emphasis in the gynandromorphic mosaïque (fig. 11). From these observations it would seem not unreasonable to suppose that the more completely differentiated individuals are

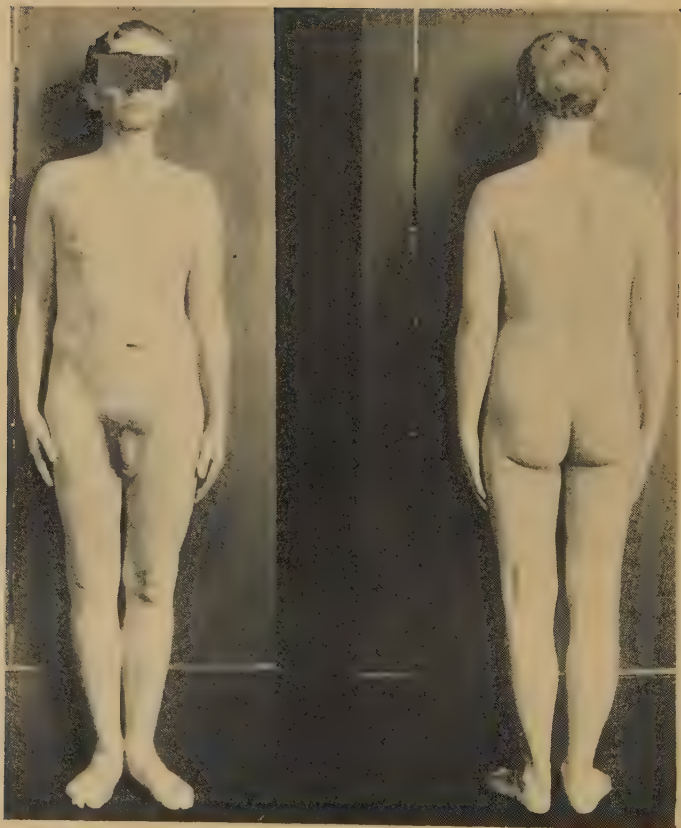


FIG. 12. Illustrating the strong emphasis of effeminate component in the gynandromorphic mosaic of a male with hyperthyroidism.

toward maleness or femaleness, the less should be their predispositions for those diseases in which the opposite sex factor is a determining one. Possibly, when studies of all the panels of personality are completed and correlated it will be found that those individuals of one sex who succumb to a disease chiefly encountered in the opposite sex will exhibit signs of an incomplete differentiation toward their own sex.

Congenital malformations. It is interesting that all forms of congenital malformation are more common in males than in females. Is this because the female, being nearer the species type, is less highly differentiated? The thought obviously suggests itself that the male being more complex, is more subject to faults of development.

Syphilis. It is exceedingly difficult to get reliable statistics for the relative syphilis rate in male and female; but there is a very general belief among physicians that the disease works less havoc in women than in men. Hutchinson's so-called law, which postulated the possibility of a healthy mother bearing a syphilitic child, bore evidence to the many cases of symptom-free syphilis in women. This tenet of Hutchinson has, of course, been practically exploded since the introduction of the Wassermann test. There is also a strong clinical impression that women develop central nervous system syphilis (paresis, locomotor ataxia, etc.), much less often than men. Statistics from State hospitals show that males develop the CNS nervous disorders about four times as often as women, but there are many more original male cases than female. Nevertheless, statistics from 88 state hospitals show that the death rate for males with general paresis was 74.7 per cent, while that for females was 68.4 per cent. Dr. Pollock's figures indicate that the annual death rate from paresis is 341 per 1,000 males under treatment, and 279 per 1,000 females under treatment.

Alcoholism. Alcoholism is about six times more frequent among males than among females. But it is remarkable that over 70 per cent of the cases of Korsakoff's syndrome, occur in females.

~~Grave's~~ *disease.* This disease is six or eight times more common in females than in males, but it is the experience of most observers, as well as my own, that males who develop the severer forms display marked gynandromorphism with noticeable emphasis of feministic traits (fig. 12).

Gout. Perhaps the greatest discrepancy between the sexes which any disease (exclusive of genital pathology) presents is that found in gout. In this case males are about forty times more likely to suffer than females. While the mechanism of gout is not yet completely understood it is now generally accepted that catabolic processes within the cell are responsible for the production of those substances which, not being excreted normally, give rise to the injurious deposits in the tissues. The malady then may properly be grouped as a catabolic or male disease. In this connection there is an interesting observation of Jamieson's (20) which points to the fact that women who develop gout have well marked a masculine component in their gynandromorphic mosaic. Jamieson refers to "Motley's picture of Margaret of Parma, with her imperious temper, masculine appearance, moustache and her gout."

Pernicious anemia. Some observers believe that this disease occurs with equal frequency in males and females, others say that more males are affected. Our findings seem to indicate that in the morphological and psychological panels alike, pernicious anemia people of both sexes are similar to one another and are reminiscent of the neuter type. They display definite eunuchoidal traits, as well as lack of adequate development of secondary characters, so that they give evidence of gonad inferiority. Tandler

and Grosz (21) have pointed out that when the secondary sex characters are absent the subject actually presents the basic species form common to both sexes. These observations suggest that there is a serious genotypic fault in the constitution of the pernicious anemia phenotype, expressed in a failure of differentiating secondary somatic and psychic sex characters. Possibly another related fault is to be found in the inadequate hematopoietic system.

Hypertension and nephritis. There is still a third manner in which sex may influence constitutional disease potentiality. While both sexes exhibit a tendency to continuous driving pressure in their psychic patterns, there is a rather striking difference in their morphology. In our series the hypertension and nephritis males, as compared with males of other disease races, were smaller and of more delicate frame. The females on the contrary, were definitely larger as compared with women of other disease groups. From this finding it was suggested that males of one subspecies and females of another possessed natural predisposition to the disease. If one could express this thought in terms of experimental animals it would be like saying that the nephritis group were composed of male airedale terriers and female St. Bernards. As a matter of fact, females of this group often display a definite masculine preponderance in their gynandromorphic mosaics.

Taking all these observations into consideration then, it would appear, first of all, that there is a definite quality of sex to be found in all the cells of the soma. The gross expression of this is the now well known group of secondary sex characters. But the evidence is strong that each cell of every tissue in the body of a male reacts differently from the analogous tissue cell of a female. These cellular differences, therefore, are just as definitely secondary sex characters as is hair distribution, body contour and

psychic pattern. From the point of view then that sex is a fundamental quality of somatic tissue protoplasm, it is clear that the susceptibility to certain diseases must often behave like a secondary sex character. With this thought in mind one cannot help advancing the suggestion that in bisexual organisms, sex may not only serve the second law of nature, but may contribute also to the first law by providing within the cells of the soma special powers of adjustment to environment for the good of each sex.

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PART III

THE PATIENT AND HIS PHYSICIAN

There has always been criticism of the medical profession. Some of this is overt and direct, some is tacitly implied by humorous references in journals and upon the stage, and still more is to be found in the astonishing increase of quackery and cults of every sort throughout the land. Doubtless a certain amount of criticism is justified; but it is probably fair to say that as fast as our inadequacies are discovered and methods are found to meet them, honest doctors strive to improve the quality of their ministrations. Physicians, however, will always be limited by incomplete knowledge and embarrassed by imperfect technique. Consequently in these respects they will even fall below the hopes and expectations of suffering humanity. Still it is unjust to place the entire onus of the failure of medicine upon the doctor's head. For he does not work alone at his difficult and complicated task of curing disease. Inevitably the patient is drawn into the fight in his own behalf. By his attitude of co-operation or resistance to the physician he can become an invaluable ally or a self-destructive agent whom no power in heaven or earth can help. While there is no doubt that doctors will always have much to learn about the art and science of caring for sick people, it is equally true that patients are for the most part quite ignorant of what it really means to help the doctor. These pages have been prepared for the purpose of setting before the patient, first a conception of the nature of disease and secondly a general discussion of the methods which must be used to attack it.

That "it takes two to make a quarrel" is an old story. The hot words, fisticuffs, black eyes and swollen lips are the evidences, the signs and symptoms of conflict. Most of the suffering of the moment, however, can be assuaged, and all future episodes of like nature can be prevented by a wise and kindly peacemaker who studies impartially all the arguments of each side and then brings about an adjustment.

The experience we call disease is just like a quarrel. Its signs and symptoms are likewise evidence of conflict between a particular set of qualities of a human being, and an equally particular set of adverse forces in the environment. These forces may come from any of the four corners of the universe, riding upon the black wings of those four grim and powerful dragons—physical violence, chemical violence, bacterial violence and psychological violence. Attacked thus from every angle by these legions of adversity, armed with bewildering variety and completeness, how shall mere man hope to live without suffering, or, indeed, even survive?

But after all, it is not so hopeless as it sounds, for Nature is the great magician, the mighty balancer of forces. For if, indeed, with a turn of one hand she hurls engines of destruction, she is able by a cunning twist of the other to set up bulwarks of defense within the living organism. Like the famous British square which Fuzzy-Wuzzy broke, the human being is possessed of four main sets of qualities whereby to resist the quadruple onslaught. But it is a rare thing to find such a square with all its four sides equally strong. For example, a man may have magnificent bones and muscles wherewith easily to withstand the dragon of physical violence concealed within his pickaxe and shovel. Yet the deft touch of a pneumococcus may send him coughing to his grave. Or again, Alice Ben Bolt, who under ordinary conditions could doubtless have

eaten raw cucumbers with impunity, was quite unable to face criticism, that dragon of psychological violence. For you will remember that though she wept with delight when you gave her a smile, she trembled with fear at the censure implied in your frown. Of course, this charming but timorous emotional flurry at once robbed her of that previous distinguished digestive success with cucumbers.

Evidently, then, the first business of the doctor is to discover the weak and strong sides of his patient's defensive square. Equipped with such a knowledge of the sick man on the one hand, and an equally keen appreciation of the circumstances of his environment on the other, the physician is prepared as a peacemaker to bring about that beneficent adjustment from which health springs like a great oak. Only when the invalid and his environment have been completely understood can he expect lasting help; only then can the physician hope to be wise and successful in his treatment. But so far as possessing a weaker side in our defensive constitutional square is concerned, we can all take some comfort from the realization that in this respect everyone is in the same boat. The only difference between us all is that each one's weak point lies in a different aspect of his individual constitution. For example, if we take a given disease, such as meningitis, we can present the situation diagrammatically as in figure 1.

Up in the right hand corner can be seen the meningococci, the little germs which are the environmental agents whose presence constitutes the bacterial violence necessary if the disease is to develop. In the left hand corner of the picture may be seen two human beings. They are different from one another, however, in many respects. Among these is their difference in capacity to react with the meningococcus. Both these individuals become infected. The result of the conflict is seen in the lower part of the picture

where figure "A" walks off unconcernedly and figure "B" lies prostrate and presents all the symptoms and signs of the "disease" meningitis.

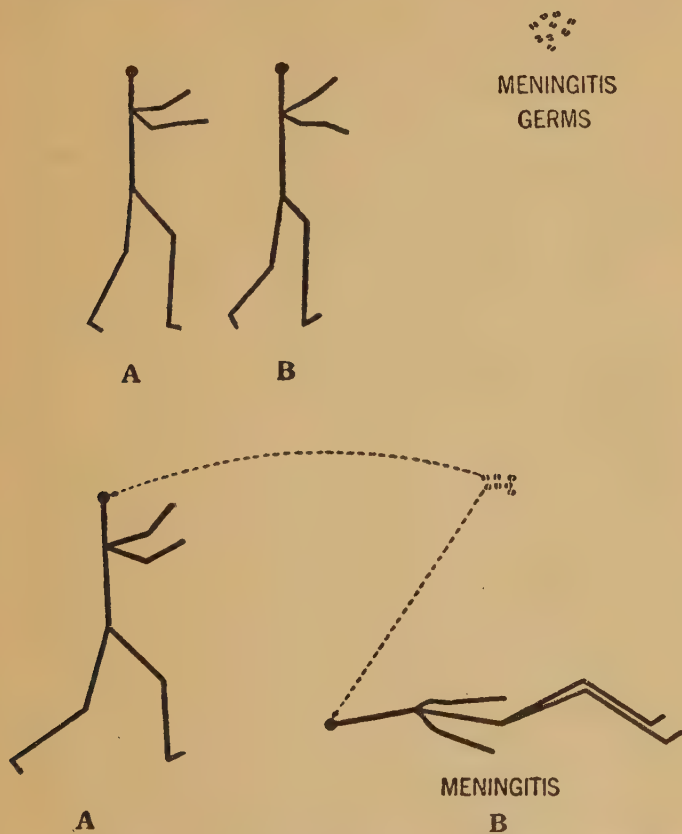


FIG. 1. Diagrammatic representation of the differing resistance of two human beings to the same disease germ.

An enormous amount of work has been done on the study of the meningococcus and a great deal is known about its personality and habits of life. But there is not

enough information about Man in relation to disease to enable us to recognize by the study of their personalities why "A" and "B" react with such astonishing difference. The effort of the medicine of the future will be to study Man with the same thoroughness that the external disease agents, such as bacteria or worry or green apples are now studied. To accomplish this the physician must so take the history and make the examination that the personality of the patient will be clearly illuminated, and his disease potentiality recognized before he meets his special menace.

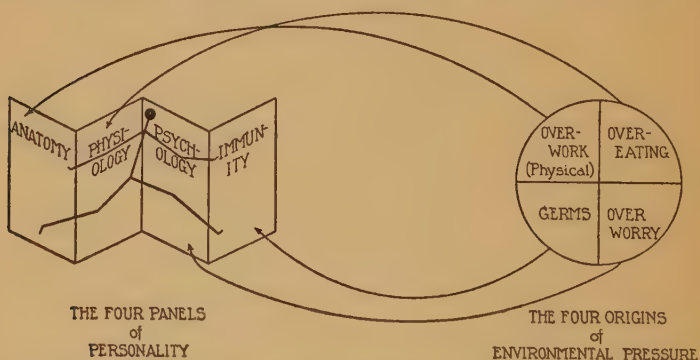


FIG. 2. Diagrammatic representation of how the various stress quadrants of the universe impinge upon the four panels of personality to produce disease.

Human beings, however, are such complicated animals that we have to divide their qualities into four categories. These are best thought of as the panels of a coromandel screen across which the picture of a man is drawn, each panel representing one phase of his total personality. Figure 2 illustrates the relationship of these qualities to the elements of stress and strain in his environment.

It is remarkable how a careful study of any one of these panels helps to inform us as to the qualities inherent in the other panels. In order to study the anatomical panel

we apply those methods of the anthropologist which have been used for many years to establish racial types. These methods involve measurements which display body conformation and proportion. The reactions of the skin to various injected proteins, for example, serve to indicate some of the qualities of the immunological panel. Metabolism studies demonstrate the behavior of the individual when sugar or oxygen is given in large quantities. Tests of the fatigability of the muscles, for example, help to disclose the nature of the physiological panel. Finally, a painstaking history of the emotional life of the individual from earliest childhood up to the present, with certain examinations of the intelligence and emotions, is necessary to clear comprehension of the subtle features of the psychological panel. It is only by carefully and thoroughly studying and then correlating the qualities of the four panels that we can arrive at a true understanding of the individual patient. But in thus taking man to pieces there is some danger of losing sight of the whole creature. Indeed, this conception of the unity of mind and body, welded together by the spark of life into an amazing, palpitating flux of vigor and sensibility, is one which we must hold before us constantly. But it is not easy to describe or formulate the effect of a given personality upon us; yet we are variously conscious of its vibrant unity and completeness. At times it may strike us sharply, impersonally, as when we stand in wonder before the uncanny operations of a great printing press; or we may sense it, intimately, with the swift poignance that comes on the flash of a gull's white wing against the pale blue and distant horizon at sea.

In whatever way a patient's personality may strike him, however, the physician should try to comprehend the elements which compose it. Some men have naturally a more penetrating intuition for this than others. Never-

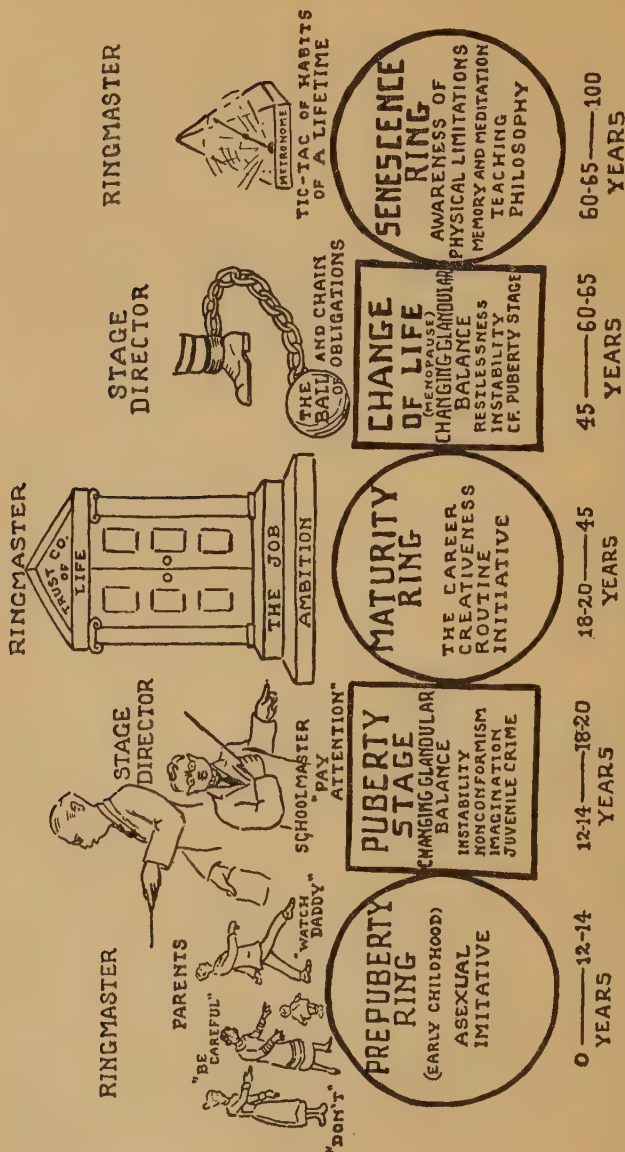


Fig. 3. The Circus of Life. Three rings and two stages.

theless, anyone's perception and understanding can be sharpened by practicing the methods of analysis which are now available. There are, indeed, certain difficulties due to growth rate differences which often render judgment difficult. For the tang of personality changes continuously from infancy to old age through successive epochs of development. There are five of these—pre-puberty, pubescence, completed adult, climacteric and senescence—apparently occasioned by the shifting relationships within the glandular system, and they can be likened to the three rings and two stages of a great circus. (Fig. 3.)

Within these rings and upon the stages we go through motions commensurate with the capacities which belong to each period of growth and development.

The first ring may be called the pre-puberty ring; and within it move the forms of children from birth till the age of fourteen or fifteen. In this ring the arrangement of the qualities of personality follows perhaps a more universally constant pattern than at any other time of life. One finds a rapidly enlarging form, an active nutrition mechanism, a generally low resistance to infectious disease, and a psyche whose outstanding quality is imitateness. Self-preservation is, as always, the controlling basic instinct at this time; and the ringmaster is the parent. An automobile which runs over one of the young animals in this ring, or a fall from the apple tree, may cause a broken bone. But the character of the break is not clean, as a pipe stem breaks, it resembles more the bending, tearing rupture of a young sapling. Indeed, such an injury is known as a "green-stick fracture." This illustrates merely the reaction between the physical pressure of the universe and the particular quality of architecture of those who find themselves in the pre-puberty ring of the circus. More subtle but more far-reaching, at least in respect of later life, are the reactions set up between the psychic pressure of the universe

and the psychological personality at this period. These young animals being highly imitative, are early impressed and moulded by the parent ring-master. Often they are so thoroughly stamped that they never quite escape parental domination, and so fail to attain full self-expression. Doubts and fears and the sense of inadequacy arise as a result, to act all through life like the strappings of a Chinese woman's foot.

Next to this ring stands the first of the two stages, which may be called the puberty stage. It is at this period that the individual is put to the great strain of a complete realignment of his physiological and psychological forces. The organism changes in a few years from an unripe, unproductive form to one capable of sowing its seed. The individuals, boys and girls, on this stage are being welded, as it were, by an intense, consuming, inner biological effort, into new links for the inexorable chain that carries on the life history of the race. The director of this part of the show is the schoolmaster. On this stage trained seals balancing cubist decorated balls on the ends of their noses, vie, with slow, cumbersome brown bears stolidly riding nickle-plated bicycles, in their efforts to accomplish, for them, the impossible and unnatural behests of the presbyopic stage director. The successful seal and bear are rewarded by a graciously tossed bit of fish or meat; those from whose irritable and unruly noses the ball tumbles, or whose bicycle falls, get the whip. It matters not that the Lord did not intend all seals to balance balls, nor all bears to ride wheels. The greatest show on earth must keep moving as advertised or the audience will leave. The job of the accredited directors of this stage is to see that it moves in accordance with the sign bill.

From these contacts flow such vitally important forces as self-confidence and its withering counterpart, the inferiority sense. Upon this stage appear all the vagaries of

adolescence. It is a period of life where imagination is perhaps at its freest and fullest, but also a time when adjustment to environment is most difficult. It is during these years that so-called misbehavior reaches its maximum. Indeed, the statistics of juvenile crime, which show a curve rising and falling between the ages of twelve and twenty, with its apex somewhere about sixteen or eighteen years, provide an admirable index of instability, that outstanding characteristic of this stage of life.

The second or central ring which next engages our attention is the ring of full adult activity—the career. The ring-master is the job of life or the boss, and the efforts of the individual are essentially constructive and creative. Here one may see the well-trained bands of horses going through orderly paces and evolutions to the dignified crack of the whip of a ceremonious ring-master. But the problems of adjustment to environment in this ring are complicated and confused by the strong influence of the creative urge. The greatest stresses in this period flow from the psychic and physiologic pressures. The latter is chiefly menacing through the great tax which over-eating throws upon the whole mechanism of nutrition. Worry, sex problems, and the awakening sense of the journey's end, form some of the load upon the psychic life.

Between this and the third ring there comes the stage of the change of life, upon which, in both its physiological and psychological aspects, the organism moves again with the same restlessness and instability which is displayed upon the puberty stage. The director of this stage cannot be so clearly defined as those of the preceding stages and rings. It is perhaps rather more an influence than an individual which directs this interesting and often perplexing time of life. This influence is like a hampering close-fitting garment wrought from the experiences of the preceding years and symbolic of obligation to family and

community which cannot be set aside. In the grip of such profound shifts of physiological balance as occur in the glands of internal secretion at this stage, the rearrangement of values and relationships of the qualities of personality is very great. Instability and change in every quality may be extreme. On this stage, under the inexorable dictation of stern obligation, a motley band of acrobats, contortionists, and jugglers appear. In real life, these shifting, unstable, creatures find their replicas in the respectable church warden, father of six, who begins guardedly to visit the stage door and finally runs off with the chorus girl; or the trusted cashier who absconds; or the comely dowager who elopes with the chauffeur. Routine, which has spelled content for many years, suddenly becomes insupportable. Furthermore, a disconcerting increase of weight and changing contour express reaction between physiologic stress and its appropriate element of personality at this time.

The final ring of the circus may be called the ring of senescence, and the ring-master is Habit. Hopelessness is not by any means the implication of the word senescence; for if the preceding epochs have been well managed, the final ring may be, of all, the most interesting, useful and happy. Enlarging powers of thought and opportunity for meditation offset waning capacities of bone and muscle. Creativeness in the realm of thought has often reached its highest expression at this period, and wisdom, which is, perhaps, the very greatest faculty of the human mind, finds here its fullest growth and broadest channels for expression. It is only in America that performance in this ring is hardest on the animals. For the much-heralded cult of a strenuous life, expressed largely in physical activity, has placed so great a value upon motion, that few can be content unless engaged daily, hourly, every moment, in making gestures symbolic of the business and athletic

habits of years. Obviously, it is not alone the annoyance provoked by physical incapacity which so distresses the animals in this ring; there arises, also, the realization that the relentless application to perpetual motion in the past has prevented any preparation for the use of those faculties of mind and heart which may be so richly developed and become so useful in this final epoch.

One cannot view this strange circus of life, then, without realizing that nature knows no standards, and that living organisms are forever changing. Nothing is static. Biological forces within the individual are constantly ebbing and flowing, melting and mixing in a ceaseless flux. At every moment in the animal's life new emotional and physiological experiences are emerging, but old ones are not disappearing; they are merely moving into new relationships. On the first stage of the circus, which has been presented as the analogue of the puberty period of the life of children, are seen the often tragic efforts at adjustment of seals and bears to quite artificial, man-imposed environment. In many respects this epoch in the life of human beings is the most difficult, not only because things outside of himself then develop greater complexity, but also because within there is in progress a cataclysmic rearrangement of vital forces. In this condition the young animal is over sensitive, irritable, fearful, and dwells in that confusing borderland where phantasy and reality strive to mingle. It is well not to deal too harshly with the former precious possession, for it is the fragile, gossamer thread that binds us to the stars.

In the past fifty years or so, so much emphasis has been placed on the external cause of disease by the medical profession that physician and layman have rather come to feel that the emotional and psychological aspects of life have little to do with the production of ill health. But no thinking person can fail to realize that man is not

divided into two compartments, one of which is a mind and the other a body. Human beings are not minds and bodies; they are, as indicated in the first lecture, "mind-bodies."

The failure to realize the fact of this unity has caused the layman to develop an attitude of mind which resents very much the implication that a symptom which appears to be purely physical in nature, such as indigestion or headache or pain in the back or eruption on the skin, has any possible relationship with the emotional life. The result of this conception is that when the patient is suffering from any obviously physical disturbance, he expects physical methods of diagnosis and physical remedy. Falsely secure in the hope that physical ills must express some easily removable physical cause, he is either surprised or annoyed by a question from the physician which suggests intrusion into the privacy of his emotional life.

It is quite characteristic for patients to present their complaints to the doctor as though they were holding up for his observation an unpleasant burden of which they would like to be relieved. "Lift it off, doctor. Do something for me. Get rid of this package of misery." With varying degrees of skill dependent upon training and experience the package is lifted to the desk, and, while the patient sits at a distance, is carefully unwrapped. The process of unwrapping so strangely wrapped a parcel requires many elaborate instruments and much practice, and becomes a fascinating occupation. Often, unknown knots and folds are met with, which in themselves are so intriguing, that before long, not only is the waiting, expectant, bearer of the package forgotten, but the contents of the parcel itself never reached. Then follows an elaborate description of the package, and finally a diagnostic label is fastened to it and it is handed back to the bearer.

For a time the patient is interested in the label and shows it, with as much pride as discomfort will permit, to his friends; and the physician may for a time gain much credit as a labeller of packages. Furthermore, having by this demand tossed the ball of responsibility to the physician, the patient then sits back and expects the doctor to remove it. Unfortunately, the former is too often persuaded that when the symptoms diminish, the package has been removed. This is the reason why quacks and cults and charlatans are so successful. They respond immediately to the request for relief, and by various superficial and transitory methods accomplish it temporarily. By this course the patient is not subject to the annoyance or embarrassment of an elaborate examination which may involve the disclosure of his emotional content. Furthermore, the onus of causal responsibility is placed outside the sick man. The simplest example of this situation is the case of a leg broken by the force of a stone which accidentally falls upon it. Obviously, in this instance, the sufferer is not responsible for his injury; forces quite beyond his control are to blame. Furthermore, the patient can do nothing about curing the hurt. The surgeon is properly expected to mend it. Another rather similar experience for the sick man is to find himself the subject of a malady whose cause is definitely something over which he has no influence, and which the doctor actually can remove, as, for example, certain germs, or a lump, or even an appendix. Consequently, the practitioner does all the work, and the patient, thus excluded from any subjective relationship with the cause and cure of his disease, gains such comfort as he may from the sympathy accorded one who has been rather badly dealt with by an adverse Fate. The attitude of the patient changes very promptly, however, if the external agent of his distress be tobacco or alcohol or over-eating. This situation is not

so easy for him. In this instance the doctor can only point out the cause; its elimination depends entirely upon the effort of the sufferer. It is astonishing how frequently people with serious and distressing symptoms will expect the doctor to relieve a situation which no one can cure but themselves. There are many persons, for example, whose physical discomforts arise from over-eating, and indeed whose lives are threatened by this indulgence. Then to save their lives, or health, or figures, they consult a physician. Their hopeful ears attend his admonitions and in their hearts spring high resolves to starve with graceful fortitude. But cream puffs and mayonnaise, roast beef and pork and puddings, at times will have their way and gain ascendance. Yet, whenever the reed of human frailty thus gently bends and patients have overstepped the spectral diet, they will regularly confess their transgressions to the doctor as though they hoped that in some mysterious fashion the confession would nullify the damaging effects of their delinquency. At best, under these circumstances, all the doctor can do is to hold out sympathetic encouragement and strive to aid the patient in the hard task of self-discipline.

There is one final barrier which inevitably rises grimly and renders the doctor's task doubly hard. For, notwithstanding the fact that a patient approaches his physician with a hopeful feeling that his ailment will be cured, there is a subtle sense of apprehension which filters into his consciousness as he enters the consulting room. Indeed, the fear which a person suffers at the thought of seeing a doctor may be so acute as to cause him to postpone making the visit. Too often, unfortunately, there are good reasons for this apprehension. Not long ago a young woman of 18 was brought to a physician by her mother. Under such circumstances it is well to test the relationship of the daughter and her mother by the simple device of

putting the first question to the daughter. Almost invariably the mother will answer. Not only will she answer, but in most instances she will enter upon an active discussion of the daughter's problem, as she sees it, recount the daughter's inadequacies as she sees them, and carry on the entire conversation with the doctor, showing complete disregard of the presence of her full grown offspring. In the case just referred to the younger woman sat with a lowering expression, an animal at bay, and heard herself discussed, by her mother, as though she were a child of five or six. The doctor listened without comment and at the end of the mother's remarks asked her to withdraw to the waiting room. She went grudgingly. The door had hardly closed upon her retreating form when the daughter burst out with "I hate doctors, I'm afraid of them and I don't trust them." Such a statement made it quite clear that for the moment at least no physician could possibly help her. Her complaint of the profession, it turned out, rested upon two well established foundations of experience. In the first place, as a little girl, she had been seized upon by large doctors in white gowns, and held, while an ether cone was put over her face. Later when she regained consciousness she was bleeding from an excessively sore throat. But perhaps the second support to her fear and hatred of doctors was even stronger. She had observed that they always held conferences with her mother just before they descended upon her. This whispering conclave, she said, had continued up to the present and she resented, in her highly intelligent and mature mind, not being taken into their confidence in matters which primarily concerned her. No wonder that she hated doctors and feared them. Her fear, however, soon vanished and her confidence was won by dictating in her presence a letter to the mother which explained that in future all her daughter's medical affairs would be given

the same professional consideration and respect which those of all other adult persons received.

But there is another curious circumstance by which physicians, inevitably stand in their own light. They represent disease, because, if it did not exist they would not be called upon. Consequently though at times they may be able to alleviate suffering or even cure, their first aspect is a terrifying one to the patient. No matter how much faith the patient may possess, the figure of the physician expresses a dual symbolism. On the one hand he represents hope and health, but, on the other, must likewise signify disease and death. This latter and forboding representation is not altogether easy to overcome, because, like all other symbolic influences, it exerts its effects, despite reason, upon the emotional levels of the subconscious mind. It menaces the instinct of self-preservation. Nevertheless, the fearsome element of the physician's symbolic presence is destroyed by the growth of mutual confidence. In the last analysis this depends upon the spiritual or psychic intimacy which is developed between the patient and his doctor.

There is no doubt, however, that by far the most difficult problem of all for a patient to face is that which leads to the necessity of dealing with the emotional life. This means the investigation of the psychological panel of the constitution and of the psychological violence which the environment has held. Now it seems to be a good deal of a trial for many people to pass through a thorough physical examination. But that is as nothing to the ordeal of seeing your soul stripped in your own or any one's company. Yet even the distress of this experience in the hands of a well-trained, wise and kindly physician will usually fall far short of its anticipated hurt. When this third difficult situation is faced by the patient, one frequently hears the question, "What has the past history of

childhood frights and humiliations, or the romance and tragedy of my life, to do with my present indigestion or asthma or headache or rapid pulse? I cannot (which really means, do not want to) talk about these things. What is the use of raking up all that material? Just give me some medicine and a diet." Patients of this group form that numberless, peripatetic army which marches from doctor to doctor in a straggling and pathetic line the year around.

Most fears evaporate when they are squarely looked at. And so it is vital to a correct understanding of many sorts of disease that the patient and the physician together should scrutinize the details of the emotional life history. To omit the study of this phase of a patient's constitution is as little justified as to neglect the discussion of details of dietary, intestinal, menstrual or muscular life history. There are, of course, many cases in which an undetected tumor or abscess or fault of body chemistry may give rise to symptoms which have all the appearance of a purely emotional disturbance. These are the patients whose recovery is unduly prolonged, or who become permanently incapacitated because psychotherapy was used without the foundation of a correct diagnosis. On the other hand, there is an even greater number of cases whose symptoms, rising from the basis of an emotional maladjustment, seem to offer convincing proof of the presence of organic disease. This group is very large. The medicine cupboards of its members are filled with a collection of bitter potions, and their abdomens are decorated by the scars of numerous unnecessary operations—all silent testimony to the earnest energy of mechanistic medicine.

It is these reciprocal masqueradings of mental and bodily symptoms which render the physician's task so difficult and the patient's road so perilous. But it is just these

masqueradings which express in terms of suffering the unity of the whole organism. They have led, however, unfortunately, to the faulty belief that suffering, or symptoms, if you will, are either of the body or of the mind. The responsibility, therefore, which a physician incurs when he enters the field of psychology in general medicine is very great. Consequently, unless his natural fitness, training and experience are of a special order, confidence of this sort should not be given him. When it is recognized that the great majority of the ills which people bring to doctors are not due to organic disease, but to the disbalance between the psychological and the physiological panels, the importance of this point of view becomes obvious. There is no state of bodily suffering, of whatever kind or degree, whether functional or organic, which does not include an emotional factor among its components. The importance of this emotional factor in any given disease depends as much upon the quality of the psychological panel of that particular patient as upon his life experience. Consequently, a physician is not justified in taking the responsibility for the management of a patient's disease problem unless either he, himself, or some competent specialist whom he may call, investigates the psychological panel as carefully as he does the other panels. There are no medical situations of importance in which the patient can hope for real and lasting relief if he hesitates to discuss all the facts of his personality and experience with the doctor.

It must be borne in mind, however, that over-emphasis of the psychological aspect of physical disease may be just as dangerous as its complete exclusion. Properly to place the emphasis on the psychological and physical aspects of a given case is the real task of the physician. The medicine of the past has been concerned largely with the study of the obvious physical disease process, and with

the external agents which help to bring them about. The medicine of the future will view disease only as the inevitable product of the clash between two sets of forces. Methods are now at hand for full and intelligent study of both these warring elements. The physician of the future will be called upon by an intelligent public to investigate, not only the outlying armies of universal violence, but also the innermost recesses of that defensive fortress which is the patient's total personality. These worthy ends can only be achieved by the wise and courageous co-operation and mutual confidence of the patient and his doctor.

12

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